APR 29 1936

Engineering News-Record

McGraw-Hill Publishing Company, Inc. April 23, 1936 Twenty-five Cents, Five Dollars per Year

The Passamaquoddy tidal power scheme began last May with relief funds and now, in modified form, awaiting approval or rejection by Congress

What About Quoddy?

The first complete story of the great tidal power project in Maine

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Photo at left shows a typical spring break-up on an undrained road. The maintenance gang is "lancing" the "boil." At the right is another section of road, drained with Armco Perforated Pipe. Note the smooth, unbroken surface—the result of proper drainage.

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Can He Make His R's *Behave?*

THE Administration again is having trouble with its R's. From the beginning it has seemed unable to effect any workable balance among its various efforts in behalf of Relief, Recovery and Reform. As it has turned its weight to any one of these it has managed usually to obstruct the others. Seldom has it achieved, even for a few minutes, any effective coordination of the measures looking toward these worthy objectives.

Nowhere has this failure been more evident than in its handling of public works activities. Originally conceived as a recovery measure to sustain during the emergency a reasonable volume of public construction, these were perverted into an extravagant and demoralizing experiment in unemployment relief, to the grave prejudice of their recovery values. Relief measures were permitted to aggravate the very conditions that had made relief necessary.

Then, too, came a parade of social and economic reforms. Here is no place to appraise them, but without doubt many of them have been desirable, necessary or even overdue. Some of them, desperately fought for a time by one group or another, already are proving their worth and winning the approval of former critics. Others, just as strenuously opposed today, may be equally worthy and eventually may be achieved also in some form. To these full credit may be ascribed.

IT may be conceded also that some of these reforms must be achieved, if ever, while the patient is in penitent and receptive mood. The time to present the pledge is in the cold grey dawn of the morning after, not when the subject has fully recovered his normal buoyancy and is looking forward to the next party.

Yet, with all due allowance for this, the administration seems to manage that its reform projects also frustrate its purpose to speed recovery. It declares, for example, that recovery must depend on the revival of private enterprise and invites industry to step out. So business takes heart and begins to plan ahead; and such planning alone can provide the foundation for revival in those industries that lag most in the march toward recovery. Then from a clear sky is launched some new reform measure, so presented and advocated as to chill the ardor of those who must assume the burden of risk implicit in forward planning. Sometimes, it is true, the damage is due less to the nature of the proposed reform than to the uncertainty it breeds and to the temper of its advocates. But the damage is done, nevertheless.

LATELY we have seen a new outbreak of the same old trouble coupled with the advent of a new R. Revenue now enters the picture as a complicating factor. Via taxation, Revenue and Reform now are in each other's hair, while Recovery stands aghast, wondering what next.

Proposals to tax corporation surpluses such as those now under debate are not new. In some form they have been discussed for years, receiving the endorsement of authorities beyond suspicion of destructive intent. But they have been advanced as reform measures, designed to encourage a disposition of corporate earnings that, to the proposers at least, seemed to be in the general interest. Even the present administration dwells on such reform objectives of its proposed tax.

But alas for all that, it offers the proposal as a revenue measure to help balance more nearly the current federal budget. And now it appears that if the reform *should* be achieved as per intent, the revenues would be a year late to do *their* job; while, if the revenues *should* be collected this year, it would be evidence that the reform had failed to take. Now someone must decide whether it really is current revenue or reform that we are after.

However worthy the objectives of the New Deal, they cannot be realized with such conflict of effort. It must be evident that the relief burden cannot be lightened without recovery and that recovery must falter until enterprise can step out into the future with reasonable certainty as to the road ahead.

Old man Business could keep his mind more closely on his job if the President just could make his R's behave.

Willard Chevalier

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The Same *Strength of Character* in Half-Ton and *Big Six-Wheeler* International Trucks

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24 to 4—Not posted odds at a racetrack but the title in brief of next week's lead story. They represent the relative cable spinning speeds on the Golden Gate Bridge and its suspension bridge predecessors, from Brooklyn to George Washington. Suggestive of what mass production has done for such items as tin cans or candles, the figures actually mirror one of the great achievements in bridge building.

The story tells how the Golden Gate cable spinning is being done. It can be recommended to every reader regardless of his specialist interests.

Mott Brothers Community at Surrey Lane, Hempstead, L. I., an outstanding example of modern construction

80 HOUSES COMPLETED 800 MORE PLANNED

All beautified with STUCCO

Stucco made with Atlas White Portland Cement was used on each of the 80 houses in this development. Furthermore all house foundations and roads were constructed with Atlas Gray Cement.

THERE are eighty beautiful houses in this new community completed in February of this year by Mott Brothers, who are the architects, builders and owners. Each house is constructed of part stone or brick and part stucco. The stucco was supplied by C. A. DeLevante, Inc. of Rockville Centre, L. I., and was made with Atlas White Portland Cement.

Eight hundred more houses are planned by Mott Brothers for a development in Garden City, L. I., all of which will be of the same construction.

The beauty of using *white* portland cement in stucco is that you can get just the right color to fit the architectural design — from pure white, through pastel tints of cream, salmon, tan, pink — to rich warm yellows, browns, greens, and other shades. Stucco made with Atlas White is economical to apply on old buildings as well as new. It is permanent, firesafe, weatherproof. It requires little or no upkeep. (*A factory-prepared stucco is preferable.*)

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S-3

STUCCO MADE WITH **Atlas White** PORTLAND CEMENT

ENGINEERING NEWS-RECORD

April 23, 1936

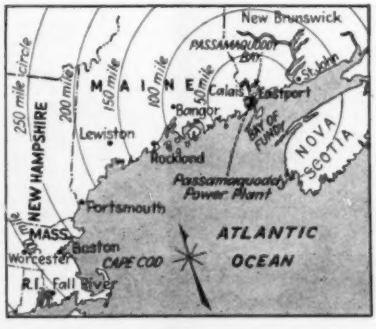
FIG. 1—AT CARRYING PLACE COVE overlooking Cobscook Bay the government has built a group of permanent houses to serve as homes for the army engineer officers during construction of the Passamaquoddy project. It is the plan that these dwellings will house the operators of the power house that is to lie across a channel cut through the lowland at the back of the cove.

Tidal Power at Passamaquoddy

In the face of serious political economic and financial questions, the magnitude of the engineering job required to harness the tides at Eastport, Maine, to electric generators is now defined in fairly clear outline

THE PASSAMAQUODDY tidal power scheme in Maine today is much more clearly defined as an engineering undertaking than it was when it was suddenly turned over to the army engineers last May but from an economic or a national policy viewpoint it is as much or more of an enigma than it was at that time. Up until the day on which the Public Works Administration announced that the President had approved an allotment of $10,000,000 of relief funds to start work on a tidal power scheme on the waters adjoining Passamaquoddy Bay in Maine little was known of the engineering elements of the project and less of its economic possibilities. At intervals over a period of ten or more years proposals to harness the tides of Passamaquoddy Bay had received some attention in the newspapers but that any such proposal had advanced to the state where work could be begun upon it quickly as a work-relief undertaking came as a surprise to everyone familiar with the project and its many difficulties.

FIG. 2—THE PASSAMAQUODDY tidal power project lies at the extreme eastern point of the United States, nearly 200 miles from any large city.



Subsequent happenings have shown that the project was not ready to be put under construction. The scheme of development then presented to the Public Works Administration was a modification of one of the several schemes worked up by Dexter P. Cooper, the original proponent of developing power from the tides in the bays around Eastport. Preliminary drawings of the principal structures had been made but much engineering information essential to complete designs upon which work could be started was lacking. After ten months of intensive work the army engineers have evolved a scheme of development, similar to the so-called Cooper scheme, upon which they could start work on a large scale if so directed by Congress. But while vastly superior in its detail to the hastily adopted Cooper project this government project still has many unknowns,

chief of which is its cost. The Cooper project was estimated to cost $36,284,000. All that is known of the cost of the government project is that it will be much more than the preliminary Cooper studies indicated.

Pending approval of the project by Congress, the army engineers are continuing their studies of the numerous engineering problems for which they seek the best solution. The economics of the project still have not been made public. When it was estimated that the project would cost $36,284,000 and would produce 264,000,000 kw.-hr. annually it was recognized that the power would not be cheap enough to attract industries to the Eastport region and there would not be enough to export were export markets conveniently available. Now that it is known that the preliminary estimate was much too low the question of where and how to dispose of the power after it has been generated becomes even more serious.

Looking backward

To get a true perspective of the present Passamaquoddy tidal power project it is necessary to go back several years and review some of the earlier proposals put forward by Dexter P. Cooper, the persistent advocate of the whole scheme, whose enthusiasm for it has not been dampened by many reverses.

Passamaquoddy Bay and Cobscook Bay (Fig. 3) are arms of the Bay of Fundy, Passamaquoddy lying almost wholly within the Canadian province of New Brunswick and Cobscook Bay in Maine. Tides in the Bay of Fundy have a range greater than anywhere else in the world. In the two bays the average tidal range is 18.5 ft., the maximum range is 27 ft. and the minimum 10 ft. Passamaquoddy Bay has an area of about 100 sq.mi., and Cobscook and its connecting waters 37.2 sq.mi. at high tide. Twice in every 24 hours the tides of the Bay of Fundy cause an emptying and filling of the upper 18-ft. level of these two great bays, the bulk of the water flowing in and out through the channels that lie north and south of Moose Island.

Eastport, Me., is located on Moose Island, and opposite Eastport, lies Campobello Island, on which Mr. Cooper has his summer home and where President Roosevelt has spent many summers since boyhood days.

In the wider channels the vast quantity of water that moves in or out of the bays with each change of tide is not apparent to the casual observer, but in the more restricted channels none can fail to be impressed with the power that goes to waste with each change of tide.

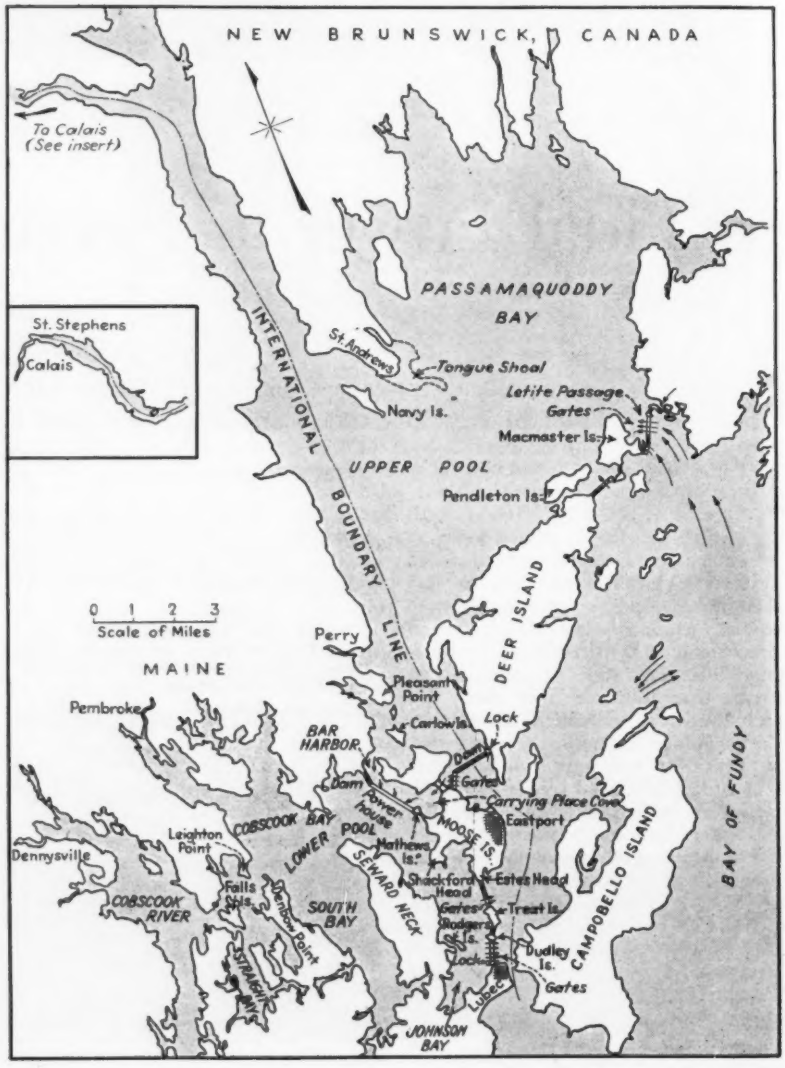
In 1919, Mr. Cooper put forward a plan for harnessing this power, building dams and sluiceways in the openings into the Bay of Fundy and powerhouses in openings between Passamaquoddy Bay and Cobscook Bay. Passamaquoddy Bay was to be filled at high tide and held as a high-level pool and Cobscook Bay was to be emptied at low tide and maintained as a low pool. Water flowing from the high to the low pool was to be passed through the power plant at varying heads as the water fell in the upper and rose in the lower pool in the interval between the filling and draining periods.

In the abstract it was an interesting proposal, one to grip the imagination. But cost estimates, even the optimistic ones made by the proponents, were close to $100,000,000 and no one knew just where the large amount of power that was to be generated could be disposed of. Further, international questions complicated the scheme greatly.

Despite the many obstacles, Mr. Cooper continued his field investigations and in 1925 obtained a charter for a development company from the state of Maine, which was voted upon and approved in a referendum in September of that year. This charter gave Dexter P. Cooper, Inc., in addition to the usual charter rights, the right to export tidal power outside the boundaries of the state, exempting the company from the provisions of the Fernald law which prohibits the export of hydro-electric power from Maine.

Up to that date Mr. Cooper had acted on his own initiative and with his own financial resources. Directly after the referendum various companies became interested in the project and asked for the privilege of looking into its engineering phases. Of these, the Westinghouse Electric & Manufacturing Co. and the Boston Electric & Illuminating Co. sent their technical representatives into the field to investigate the project. After their report was made these companies joined with Mr. Cooper in carrying on the engi-

FIG. 3—THE INTERNATIONAL SCHEME, as originally proposed by Dexter P. Cooper, used Passamaquoddy Bay as a high-level pool and Cobscook Bay as a low pool. The position of the powerhouse as shown is different from that referred to in the accompanying description of the international scheme.



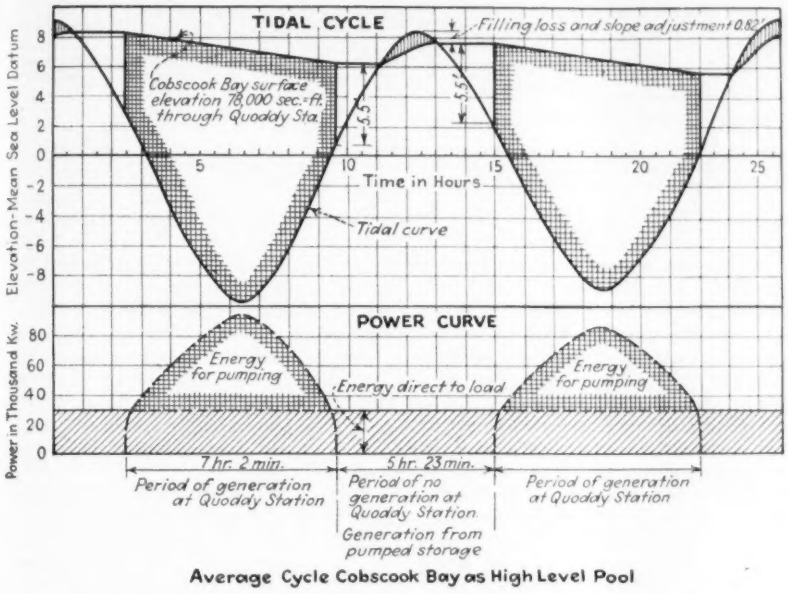

TIDAL CYCLE
Filling loss and slope adjustment 0.82
Cobscook Bay surface elevation 78,000 sec.-ft. through Quoddy Sta.
5.5
5.5
Time in Hours
Tidal curve
Elevation-Mean Sea Level Datum
POWER CURVE
Energy for pumping
Energy direct to load
Energy for pumping
Power in Thousand Kw.
7 hr. 2 min.
5 hr. 23 min.
Period of generation at Quoddy Station
Period of no generation at Quoddy Station
Period of generation at Quoddy Station
Generation from pumped storage
Average Cycle Cobscook Bay as High Level Pool

FIG. 4—A TYPICAL TIDAL CYCLE in Cobscook Bay as it is used in generating power with a high level pool.

neering investigations. At a later date, the General Electric Co. and the Middle West Utilities Co. joined the group.

During the time these studies were under way, Mr. Cooper sought and obtained an act of the Canadian Parliament incorporating the Canadian Dexter P. Cooper Co. with authority to develop tidal power in Passamaquoddy Bay in New Brunswick. Very wide powers were granted. The act specified that the work must be begun within three years and completed within six. When no work had been begun within three years a bill to extend the time two years was introduced in the Dominion legislature but failed to pass, and since then the charter and all rights have automatically expired.

In 1926 the Federal Power Commission granted a preliminary permit for a project to generate 250,000 hp. of primary and 650,000 hp. of secondary power. Under this permit some wash borings were made at the site of some of the dams, and tentative designs were made for proposed structures. Included in these studies was one proposal to transmit the surplus secondary power to a point fairly close to Boston where a pumped-storage reservoir could be built, thus making it possible to use the pumped storage to carry the peaks of the Boston load curve.

Smaller project considered

Subsequently, because of opposition to the international development, studies were made for a project entirely within the state of Maine. In 1929, Dexter P. Cooper, Inc., made application to the Federal Power Commission for a license to proceed with such a project but no final action was taken on that application until late last year, when it was denied, to clear the record, as the applicant company recently had agreed to transfer all rights to the federal government.

Public financing sought

Establishment of the PWA in 1933 paved the way for a new effort to finance the project, this time with public money at interest rates sufficiently low to reduce power costs to more attractive levels. Also, business in eastern Maine, especially in Eastport, was at a low ebb and unemployment was high. The project then proposed was confined wholly to the United States but was so planned as to make it fit in with the larger international development. It was rejected by the PWA technical board of review on the ground that there was no market for the power.

In 1934 the Governor of Maine appointed a commission to report upon the social and economic phases of the project. Its report, published early in 1935, indicated in a general way numerous possible uses for the power but brought forth no definite recommendations. The commission was handicapped by not knowing at what price the power could be sold.

In November, 1934, Secretary Ickes appointed the Passamaquoddy Bay Tidal Project Commission to report upon the project as a work-relief undertaking. This commission, consisting of Dexter P. Cooper, M. B. Pike, H. T. Cory and Henry T. Hunt, reported in January, 1935, favoring a project limited to Cobscook Bay in Maine and using a pumped-storage plant to supplement the tidal power plant.

With the passage of the Emergency Relief Act of 1935 proponents of the project renewed their efforts, with the result that the President approved the allotment of $10,000,000 to start work on a project as outlined by the commission. This approval of the project as a federal undertaking came in May, 1935, and the army engineers at once were ordered to take charge, Lt. Col. Philip B. Fleming going to Eastport to set up a district office.

Made a federal project

Up to that time the project had been put forward as a private undertaking with the permit from the Federal Power Commission held by the firm of Dexter P. Cooper, Inc. Upon the decision to take it over as a federal operation negotiations were begun with Mr. Cooper to obtain his rights. In October, the War Department announced that all rights, franchises and plans had been obtained through the payment of $60,000 to Dexter P. Cooper, Inc., this amount being set as the present value to the government of the work already done on the project. Government auditors found that a total of $406,852 had been spent by Mr. Cooper's organization. Mr. Cooper also agreed to serve as a consultant, at no additional cost to the government other than his salary as an adviser to the National Power Policy Committee. In the latter capacity he had already set up an office at Eastport to study the market for Passamaquoddy power.

Tides at Eastport

The tidal cycle in Passamaquoddy and Cobscook Bays has an average period of 12 hours and 25 minutes. It may deviate by 15 or 20 minutes from this average. The average range at Eastport is 18.1 ft. The extreme perigee spring tide reaches about 27 ft., while the extreme apogee neap tide may be only 10 ft. These extreme tides, whether spring or neap, are very rare, and are the result of maximum astronomical conditions, combined with unusual local storm and barometric conditions. A safer criterion is the height of range reached 10 and 90 per cent of the time. For 10 per cent of the year the range equals or exceeds 22.2 ft., while for 90 per cent of the year the range equals or exceeds 14.8 ft.

There is a gradual increase in range in Passamaquoddy and Cobscook bays as the distance from the open sea increases, except for the farther reaches of Cobscook Bay. For example, the range at Calais exceeds that at Eastport by 10 per cent. This increase, of course, is nearly equally distributed between high and low water, with very little change in mean tide level.

The areas of Passamaquoddy and Cobscook bays are:

	Passamaquoddy Sq.Ft.	Cobscook Sq.Ft.
At 10.0 feet.....	2,804,000,000	1,046,000,000
Mean sea level (M. S.L.).....	2,733,000,000	956,000,000
—10.0 feet.....	2,560,000,000	723,000,000

The volumes of water between 10.0 feet and —10.0 feet are:

	Cu.Ft.	Acre-Ft.
Passamaquoddy Bay..	54,300,000,000	1,246,000
Cobscook Bay.....	18,550,000,000	425,000

Tidal power projects

International Plan—The international plan contemplated the use of two basins, one to be filled at high tide and kept at a high level, and the other to be used as a receiving sump, emptied at low water and always at a much lower level than the other pool. In the original Cooper scheme, Passamaquoddy Bay acted as the high-level pool, with most of the filling gates located in Letite Passage between the northeastern end of Deer Island and the mainland. The balance of the filling gates were planned near the power house between Deer Island and Moose Island. In every case the gates were planned in the shallower sections, with the deeper channels blocked by rock-fill dams.

In this scheme, Cobscook Bay served as the receiving basin, or sump. This pool was formed by a line of structures extending from Estes Head, Moose Island, to Treat Island, to Dudley Island, and thence to Lubec. This is also the line of closure of the present project. The emptying gates for the international project were located between Dudley and Treat islands, and also at the north end of Treat Island. The other channels were blocked by rock-fill dams. Locks were provided for access into both pools.

In a later development of the international scheme, not shown in Fig. 3, the location of the powerhouse was altered somewhat to give it a direct connection with the sea. So located, through the use of by-pass or auxiliary gates, it would be possible to discharge tailwater directly into the sea, while the lower pool, or sump, was being emptied, and for several hours afterwards, thereby having the falling sea level rather than the higher low-level basin as tailwater, with resultant increase in head during this period. Such an arrangement was found to be desirable because of the great difference in size between the two pools, Passamaquoddy Bay being three times as large as Cobscook Bay under the assumed operating conditions. The use of by-pass gates thus shortened the time that Cobscook Bay was used as a sump, and permitted a much greater rate of discharge into it during its period of operation, with a resultant greater energy output during this period. The same result is possible of attainment by the construction of a separate powerhouse directly between the upper pool and the sea, but this would entail considerably greater expense.

A typical cycle of operation would be as follows: Starting at high tide, the upper pool is almost full, the filling gates are open and the sea water is rushing in; the lower pool is about halfway between low water and mean sea level, with its gates closed and water coming into it from the upper pool through the powerhouse. This stage continues until a few minutes after high tide, when the upper pool reaches the level of the sea, which is now falling slowly. At this time the gates between the upper pool and the sea are closed; the flow continues through the powerhouse, with the lower pool rising and the upper pool slowly falling. After about two hours the sea has fallen to the level of the lower pool, and the gates emptying the lower pool into the sea are opened; it is at this time that the so-called auxiliary, or by-pass, gates are used, and the powerhouse discharge from the upper pool is diverted from going into the lower pool and shunted directly into the sea; the emptying of the lower pool continues until a little after low tide, when, the pool having reached its lowest level, the emptying gates are closed. In the meanwhile the powerhouse has been discharging through the auxiliary gates, and continues to do so until the head between the upper pool and the rising sea is too low for effective turbine operation. Then the auxiliary gates are closed and the tailwater goes into the lower pool again. Shortly after this time the falling upper pool and the rising sea are at the same level, and the gates into the upper pool are opened, thus completing the cycle.

TABLE I—AVAILABLE POWER IN THE PRESENT PROJECT AND THE INTERNATIONAL SCHEME

	Kilowatt-Hours per Year			
	Main Tidal Plant		With Pumped Storage	
	Primary	Secondary	Primary	Secondary
Cobscook Bay, Initial (10 units)..	0	336 million	263 million	0
Cobscook Bay, Ultimate (20 units)	0	602 million	463 million	0
International, Ultimate.....	*525 million	2,575 million	2,400 million	0

*The figure for primary output is the 100 per cent point reached during calculations, the primary object of which was the production of maximum energy. Operation for maximum firm power would greatly raise this value at some sacrifice in total annual energy output.

Alternate proposals

Many other methods of obtaining energy from the tides in Passamaquoddy and Cobscook bays have been examined, among which may be mentioned the following:

(a) *Division of Passamaquoddy Bay into two parts by means of a dam from the Tongue Shool to Pendleton Island*—This is about the most advantageous use that can be made of this bay, as it gives great energy with high minimum power, due to the nearly equal size of pools. The great length and cost of dam structure are the chief objections to this method of development.

(b) *Use of Cobscook Bay with a two-way-flow power house*—The energy production is greatest by this method, but very large quantities of water must be passed through the powerhouse in a short period of time and the structure is relatively complicated. There is also the period of total cessation of generation.

(c) *Division of Cobscook Bay into Two Parts*—If Cobscook Bay is taken by itself, leaving the international plan out of consideration then an excellent layout may be developed by means of a dam from Seward Neck to Leighton Point, with the power house at one end. The filling gates would be located at the base of Seward Neck, and the dam that now goes from Dudley Island to Lubec would extend from Dudley Island to Rodgers Island.

But the international plan is the background of the whole situation, and to develop Cobscook Bay and still leave the way open to the international scheme, without excessive cost, the powerhouse for the Cobscook Bay plan must be located so that it will have contact with Passamaquoddy Bay. This means that the powerhouse must be in the neighborhood of Bar Harbor or Carrying Place Cove. Once committed to this location, then Cobscook Bay can be divided into two equal pools only by a dam from Mathews Island to Seward Neck and thence to Denbow Point. This was the proposal which at one time was presented to the PWA. It has the advantage of considerably more energy generation with the same installation than the one-pool scheme, *i.e.*, 626 million kw.-hr., as against 318 million kw.-hr. There is continuous power generation with correspondingly less installation in the power storage plant. This plan has the objection that it requires destruction of the long dividing dam in Cobscook Bay and the filling gates to make the shift over to the international plan.

(d) *Falls Island Plant*—The possibility was also investigated of building a very small plant at Falls Island, and then expanding it as the market grew, by the addition of other water bodies. The initial step contemplated Cobscook *River* as the lower pool and Straight Bay as the upper pool.

The second step retained Cobscook River as the lower pool, with Straight Bay and South Bay as the upper pool. The third step used as the lower pool Cobscook River and Cobscook Bay, north of a line from Denbow Point to Seward Neck, and from Seward Neck to Shackford Head on Moose Island. As the upper pool, Straight Bay, South Bay, and Johnson Bay were used. As a final step a division of Passamaquoddy Bay into two parts may be considered. This method permits the development of the system with the load growth, but runs to considerably greater overall cost than if the whole project were developed at one step.

TABLE II—PRINCIPAL COST ELEMENTS OF THE COOPER PLAN

Pleasant Point Dam (2,700 ft. long x 33 ft. high)	$150,000
Carlow Island Dam (1,500 ft. long x 33 ft. high)	100,000
Carrying Place Cove Dam (2,000 x 30 ft.)	150,000
Main powerhouse: 10—20,000 hp. turbines, 10—16,667 kva. generators	12,000,000
Eastport Dam (3,400 x 140 ft.)	2,500,000
Emptying gates	3,248,000
Lubec Dam (3,800 x 90 ft.)	1,100,000
Navigation Lock	300 000
Transmission Line between power plants	1 500 000
Haycock Reservoir: 9—20,000 hp. pumps, 2—30,000 hp. turbines, 2—22,500 kva. generators	9,077,000
	$30,125,000

TABLE III—COMPARISON OF THE COOPER PLAN WITH THE PRESENT PROPOSAL

	Cooper Plan	Government Plan
1. Location of dams	Pleasant Point, Carlow Island, Eastport, Lubec	Generally the same but all dams are rockfill
2. Location of powerhouse	Carrying Place Cove, between Moose and Mathews Islands	Carrying Place Cove, at the Carrying Place
3. Location of filling gates	Between Treat and Dudley Islands	Same (See note (a) below)
4. Location of navigation lock	In Dudley Island on Lubec Dam side	Same (See note (b) below).
5. Auxiliary Power	Haycock Reservoir storage for hydro plant.	Same (See note (c) below).
6. Transmission lines	Haycock Reservoir powerhouse to tidal powerhouse (about 16 miles)	Same (See note (c) below).
7. Tidal power installation	10 units @ 15,000 kw. = 150,000 kw.	10 units @ 12,500 kw. = 125,000 kw.
8. Auxiliary power installation	2 generating units @ 22,500 kw. = 45,000 kw. at Haycock Reservoir powerhouse and 9 pumping units of 20,000 hp. each.	8 combined pumps and turbines @ 8,570 kw. = 68,500 kw. Haycock Res. powerhouse (See note (c) below).

NOTES:
(a) Recent studies contemplate the location of the filling gates in a channel to be excavated through Treat Island.
(b) Recent studies contemplate the location of the navigation lock on the north side of Treat Island.
(c) The original government plan provides for an auxiliary hydro-electric power station on the west side of Haycock Reservoir, with a transmission line leading from there to the tidal powerhouse at Carrying Place Cove (about 14 miles). In recent studies consideration is being given to the possibility of substituting an auxiliary steam electric power station in lieu of the Haycock Reservoir and hydro station.

Cooper Plan approved

The method of development favored by the Passamaquoddy Bay Tidal Project Commission and approved by the President is shown in Fig. 5. For convenience it is called the *Cooper Plan* to distinguish it from the *Government Plan* as now developed. It was limited to Maine but was so laid out that it would fit into a future international scheme. Cobscook Bay was to be isolated by a series of dams beginning at the north with shallow earth and rock-fill dams from Pleasant Point to Carlow Island and from that island to Moose Island, and by major rock-fill dams from the south end of Moose Island to Treat and Dudley Islands and thence to Lubec.

The Eastport and Lubec dams would have a total length of 7,200 ft. and a maximum height of 140 ft. above the bottom, which is a clay bed averaging about 100 ft. thick to rock.

Cobscook Bay was to be maintained as a low pool, drained by discharge gates between Dudley and Treat Islands. The powerhouse, to give it the required connection with Passamaquoddy Bay, was located at the westerly side of Carrying Place Cove and its headrace canal was cut through the cove and through the neck of Moose Island. A navigation lock was to be built through the Dudley Island end of the Lubec Dam.

As in all single-pool schemes, this plan results in two periods of no generation each day. To furnish power during these periods it was proposed to use part of the power at times of peak output of the tide plant to pump water to a storage basin called Haycock Reservoir to be built in the hills south of Lubec. When tide conditions made it necessary to shut down the tidal power plant, water from this reservoir was to be returned to the sea through a second power plant close to the reservoir.

The reservoir was to have a capacity of 130,000 acre-ft. between El. 100 and 120 and it was proposed to install in its combined pumping and power generating plant nine 20,000 hp. electric-driven pumps and two 30,000 hp. hydraulic turbines directly connected to 22,500 kva. generators.

The tidal powerhouse was to have space for 22 units and an initial installation of ten 20,000 hp. fixed-blade propeller-type turbines driving 16,667 kva. generators. The powerhouse was located at the Cobscook Bay side of Carrying Place Cove to reduce the deep excavation required for the tailrace into that bay. When used in connection with the pumped-storage plant this installation gave a continuous output of 30,000 kw. or 264 million kw.-hr. annually. This location of the powerhouse also would facilitate the division of Cobscook Bay into two parts, as previously described in section (c), if found desirable.

A battery of 25 vertical-lift 30x30 ft. gates was to be installed between Treat and Dudley Islands to empty the

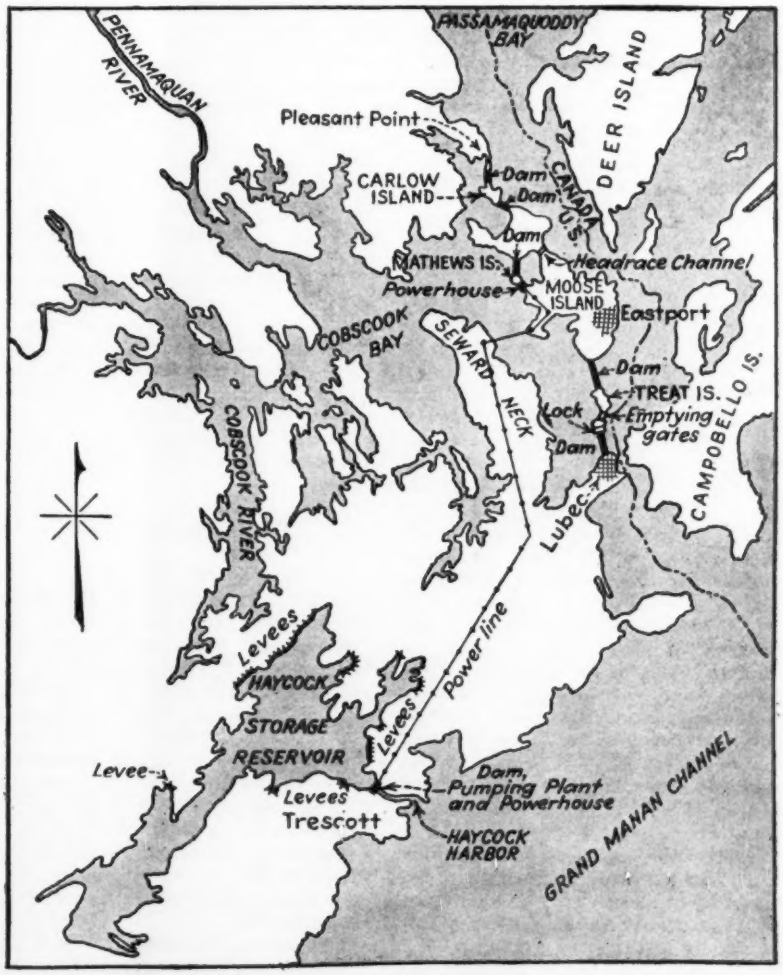


FIG. 5—THE COOPER PLAN approved by the Passamaquoddy Bay Tidal Power Commission was confined to the state of Maine but laid out to make it adaptable to the larger international scheme.

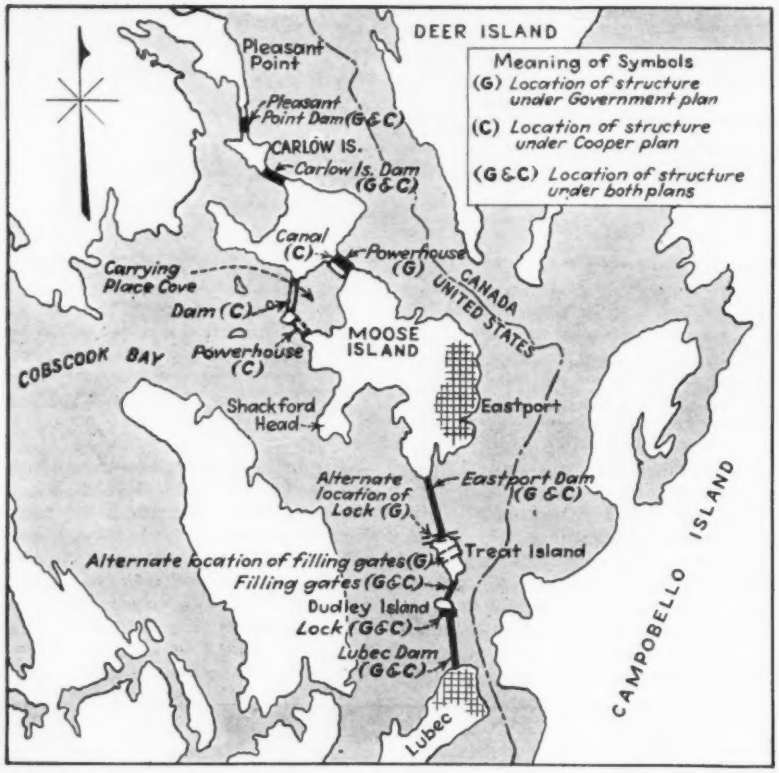


FIG. 6—THE GOVERNMENT PLAN is developing as a modification of the Cooper scheme. The principal changes, except those at Haycock Reservoir, are here shown.

pool. Their maximum capacity was estimated at 550,000 sec.-ft.

New studies begun

The task of the army engineers when they moved into Eastport in June was not the usual one of preparing specifications and contract drawings and issuing a call for bids. Though Mr. Cooper had spent a large sum on the project over a long period of years it still lacked information essential to complete designs for the project as then laid out. Three core borings had been taken in the vicinity of the proposed powerhouse and wash borings had been made at the site of the other principal structures except the pumped storage reservoir. Information as to foundation conditions for the reservoir dikes was lacking, but more important still was information as to the character of the 100-ft. thick clay beds in the bottom of the deep channels between Eastport and Lubec upon which it was proposed to build high rock-fill dams. If this clay was firm enough to carry the rock fills, as Mr. Cooper had assumed in his plans, his estimate of the cost could be accepted with minor modification, but if it was unstable the rock quantities might be increased three or four times.

These studies were begun last July as rapidly as the army engineers could get a staff organized at Eastport and have been carried forward in the field since that time. To supplement and extend the field studies, hydraulic laboratory studies have been undertaken at the Alden Hydraulic Laboratory at Worcester Polytechnic Institute to determine (a) the most satisfactory design for the sluice gates and navigation lock, (b) the cross-section of the rock-fill dams, and (c) the size of stones required for the upper part of the dams, where high velocities will be encountered during construction at each change of tide. Studies of the corrosive effect of seawater on structures and equipment are being made at Eastport.

The Government Plan

The Government Plan as tentatively set up at the present time follows the general form of the Cooper Plan just described but important changes have been made in it, chief of which are the use of Cobscook Bay as a high-level pool and elimination of the Haycock pumped-storage reservoir. If a more suitable site for a pumped-storage reservoir cannot be found it is probable that an auxiliary steam power station will be built. Location of the principal structures of the Government Plan are shown in Fig. 6, which drawing indicates their relation to the Cooper Plan shown in Fig. 5.

The matter of whether to use Cobscook Bay as a high or low pool was one of the first questions considered by Col. Fleming and his staff because upon this decision hung part of the decision as to the position and character of the powerhouse and important elements of the emptying gate and lock designs, also decision as to which side of the main dams was to be blanketed with clay. Closely related was the question as to whether the powerhouse should be designed so that the direction of flow through it could be reversed at a later date.

The decision was to use Cobscook Bay as a high pool. Maintenance of the waters of the bay at a high level will cause the least disturbance to the fishing and other navigation interests in that area and will make the bay more attractive from a recreation viewpoint. From an operating angle the high-level pool gives a greater water area within the operating range and less slope in the channel for movement of water in filling the bay. The period of generation will be 15 min. longer. Excavation in connection with the powerhouse and filling gates is reduced.

As far as its lack of adaptability to the international scheme is concerned, the army engineers have concluded that the operating structures now being built will have served a large part of their useful life, and might even be obsolete, before the international project can reasonably be expected to be undertaken.

This decision clinched an earlier decision to place the powerhouse in the low neck through Moose Island known as Carrying Place (see Fig. 6) instead of at the mouth of Carrying Place Cove where Mr. Cooper had located it, to avoid a deep tailrace cut through the cove that was required when Cobscook Bay was to be used as a low pool. The earlier decision had been reached on the ground that the powerhouse would have better foundations and could be built in the dry if placed in the shallow neck of land, where foundations for a railroad and highway bridge would have to be built in any case. The highway and railway can be carried on the powerhouse structure at little added cost.

Cooper's plan called for construction of the navigation lock within a cofferdam adjoining Dudley Island; the army engineers plan to make a cut for it through the island. Rock has to be quarried for the dam, and by building the lock in a rock channel concrete is saved, the work can be done in the dry and the deep and expensive cofferdam is eliminated.

An interesting element of the new lock design is the use of sector-type lock gates in place of the conventional miter gate; a sector gate has been found to be peculiarly adapted to the changing water levels to be met at the Quoddy project.

The design of the filling gates has been the subject of exhaustive study, including the use of models, because much depends upon their efficiency.

The earlier studies, carried over from Cooper's staff, leaned toward a submerged venturi type gate, but now that Cobscook Bay is to be a high level pool a simpler open sluice type is favored. More total gate area is required, 24,000 sq.ft. as against 15,000 sq.ft. for a flow of 270,000 sec.-ft., but construction costs are lower.

Reservoir changes

The Haycock reservoir site has been abandoned because exploration of the reservoir area revealed that some of the proposed dikes would have to be built on beds of clay of low shearing value while others would be over porous glacial moraines through which salt water from the reservoir might find its way into the fresh water supplies of the surrounding region. As a result of these unfavorable findings other possible sites are now being studied, chiefly one near Calais, but, as previously noted, the whole pumped-storage plan may be abandoned and an auxiliary steam or diesel station substituted or interchange made with existing utility systems. This is one of the major questions still to be answered.

Main dams

The principal design question yet to be answered is how much rock is going to be required to build the 7,200 ft. of dams between Eastport and Lubec. These dams are to be rock fills blanketed with a thick clay fill on the bay side. The maximum height of the Lubec dam above sea bottom is about 120 ft. and of Eastport dam 170 ft., the dams extending 20 ft. above mean sea level.

Mr. Cooper's preliminary examination of the bottom indicated that the maximum depth of the underlying clay was about 100 ft. and that the bottom was sufficiently stable to support the proposed rock fills. Core drilling by the army engineers has revealed depths to rock reaching a maximum of 264 ft. below low water, as shown in Fig. 7. Examination of the clay cores in the laboratory has revealed further that the clay has a low shearing value and may be expected to squeeze out under the load of rock dumped into the dam. How much will be displaced is one of the questions that is being studied at the soils laboratory set up by the army engineers at Eastport. Obviously, if the rock mass is to settle down to the rock bottom the original estimate of 4,500,000 cu.yd. of rock in the dams will have to be increased, possibly three or four times. How long it will be before settlement stops is another question.

Rock for the upper part of the dams is providing a knotty problem. It was proposed originally to build the dam with rock quarried, in large part at Shackford Head on Moose Island, loading the rock on barges to be towed to and dumped in the dam. This rock is a massive diabase or trap of great toughness and durability but it breaks into relatively small blocks. Such stone will be satisfactory for the dam up to El. —30, at which point currents over the dam at each change of tide will begin to be swift, increasing up to as high as 20 ft. per sec. as the dam rises. To meet this latter condition blocks of from 5 to 20 tons' weight will be needed and few of them will result from the quarrying either on Moose Island or Treat Island. Consequently other quarry sites are being studied. Granite is available near Calais but transportation costs will be higher. It is planned to place the larger blocks by cableway.

Despite the indefiniteness of the plans handed to the army engineers last May they have succeeded in keeping a large force of men employed on preliminary construction. The purpose of the original allotment of $10,000,000 to the project was to create employment in a region where unemployment was high. When it developed that the project itself could not be undertaken at once the allotment was cut to $5,000,000. As that sum was largely spent or obligated by the end of 1935, $2,000,000 more of the original sum was reallocated to the work. Last week, the President stated that no more allotments from relief funds would be made to the project. Unless Congress makes a direct appropriation (and this appears unlikely in view of the generally hostile attitude expressed whenever the subject has been discussed), the President's action would indicate that the project is scheduled for abandonment.

Housing

Lack of adequate housing for the staff and of space for offices and drafting rooms was one of the first problems faced by the army engineers upon their arrival at Eastport, and as the staff grew the question became more acute. Plans for housing therefore were pushed, and bids were taken in August on the first housing unit consisting of one group of 9 houses, permanent quarters for operators to be used by the administrative staff, and a second group, including 120 single and multiple houses with accommodations for 245 families. This latter group was the first unit of the temporary town, Quoddy Village. The structures are of simple but sound construction, so built that they can be used as an industrial town after completion of the project.

Bids soon were called on a second unit of the temporary village, including a large administration building to

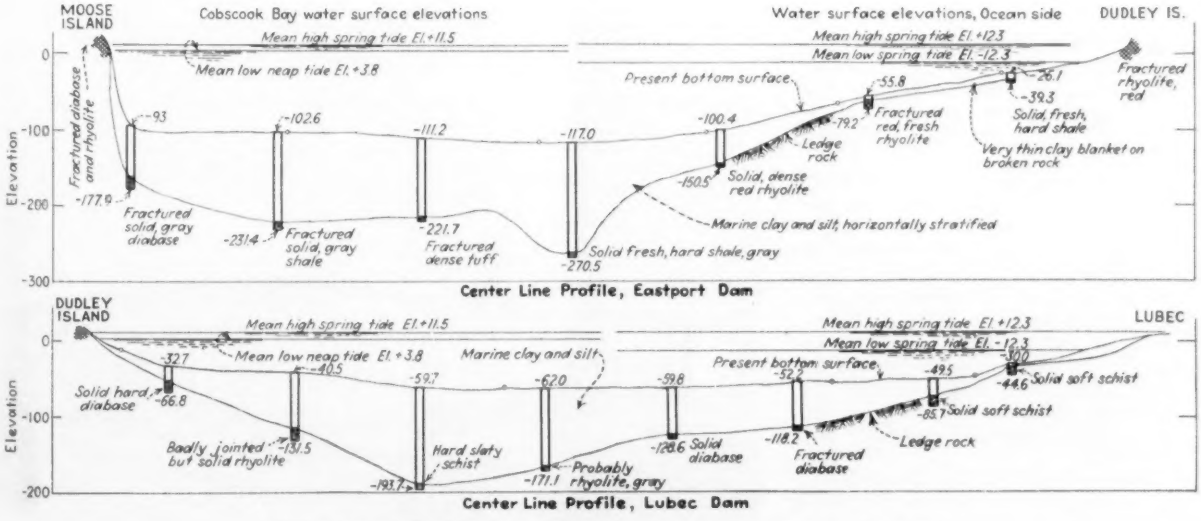


FIG. 7—PROFILES of Eastport and Lubec dams, developed from drill cores, show the underlying clay to be deeper and less stable than earlier exploration indicated.

house the scattered offices, two apartment buildings of 40 apartments each, one dormitory, a hospital, school, recreation building, central heating plant, and utility building. Both units will provide housing for about 1,000 people.

An attractive, partly wooded site near the north end of Moose Island was chosen for the town. Grading for streets and laying service mains was begun at the time bids were called on the first unit. To meet immediate needs four bunkhouses and a messhall were built in the warehouse area adjoining the railroad yard in Eastport. Later, eight more bunkhouses and two messhalls were built at Carrying Place Cove to meet a shortage of housing for labor.

Every effort was made to prevent the construction of unsightly and unsanitary hanger-on-towns such as have sprung up at Fort Peck and Grand Coulee. To accomplish this the town of Eastport passed a zoning law requiring the approval of the building inspector before any structure can be erected within the town limits. As the town limits include the whole of Moose Island and as the mayor is also the building inspector, all building construction can be well controlled. Lieut. Col. Philip B. Fleming has been named a deputy building inspector to give him authority over the temporary building work.

Construction of the housing, administrative buildings, warehouses and services outlined in the preceding paragraphs and the underground exploration of dam sites are the principal construction operations of the past ten months. The building work is nearing completion. It accounted for a large part of the employment created by the undertaking, which reached a peak of about 5,300 in the early winter. Much of this work was done by contract. It cost about $1,500,000.

Core drilling

Most interesting of the preliminary operations is the core drilling to determine the character of the deep clay beds and the underlying rock on the ocean floor along the sites of Eastport and Lubec dams.

Bids on both land and marine boring were called in August and a contract for the land work was awarded to Sprague & Henwood, Inc., Scranton, on a bid of $90,295. A bid of $286,830 for the marine work by Merritt, Chapman & Scott, New York, was rejected as too high and the army engineers undertook the work on force account and have it well along toward completion.

Because of its unusual character, this work will be described separately at a later date.

Within recent weeks work was started on the small dams that connect Moose Island with the mainland. These dams fit into any scheme that may be adopted and in any event will replace the trestles by which the Maine Central R.R. line to Eastport crosses to Moose Island.

FIG. 8—APARTMENT HOUSES have been built in Quoddy village for accommodation of part of the employees on the project.

On March 19 bids were received for the excavation of 335,000 cu.yd. of rock from the site of the navigation lock on Treat Island, including the close drilling and broaching of the interior faces of the lock channel. The excavated material is to be placed in an 800-ft. section of the proposed dam between Moose and Treat islands, partly by trucks and partly by scows.

This work is expected to be completed by fall, at which time bids will be called on the lock and its equipment.

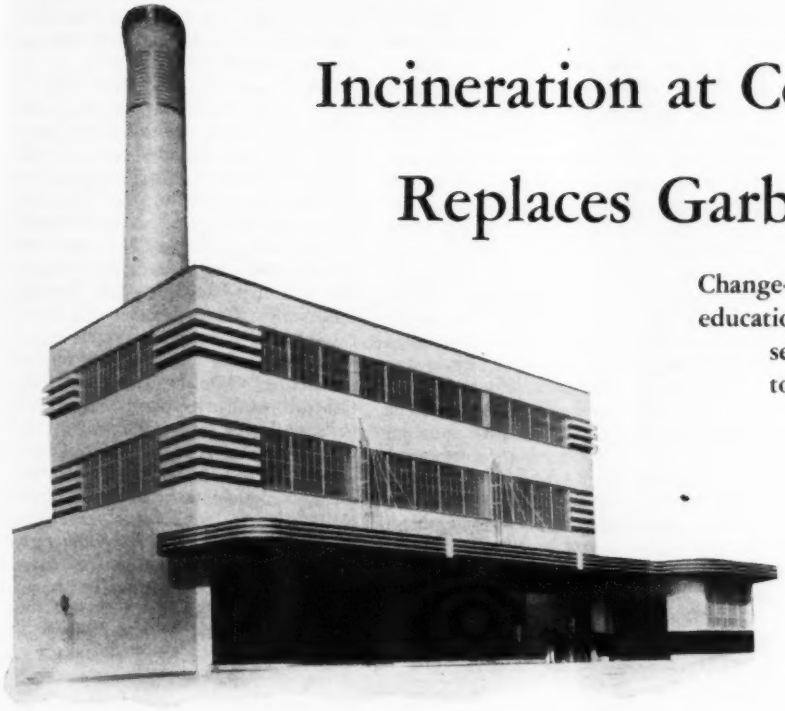
Specifications for dredging the headrace channel for the powerhouse in Carrying Place Cove and for excavating the soft overburden at the site, also for an earth dam to carry the highway to and across the powerhouse are being completed and it was planned to advertise for bids on these items, involving about 1,000,000 yd. of excavation, as soon as funds became available.

Plans and specifications also have been prepared involving the excavation of about 3,000,000 cu.yd. of rock from the south end of Treat Island for the filling-gate structure. This rock, together with 1,250,000 cu.yd. of sand and gravel is to go into the base of the rock-fill dams.

Plans for the filling-gate structure itself are well along as are plans for excavation of the powerhouse site, the powerhouse and its cofferdam. Plans for the railroad bridge over the tailrace channel have been completed as that bridge must be completed before excavation of the channel reaches the existing railway line.

The work at Eastport is under the general direction of Maj. Gen. Edward M. Markham, Chief of Engineers, U. S. Army, Washington, and Col. George R. Spalding, division engineer, New York. Lieut. Col. Philip B. Fleming is district engineer at Eastport and Capt. Hugh J. Casey, Capt. Samuel D. Sturgis, Jr., Donald J. Leehey and Royal B. Lord are his principal assistants.

FIG. 9—AN ADMINISTRATION BUILDING was built in Quoddy Village as one of the early operations because of the lack of adequate office space in Eastport. At a small increase in total cost an attractive appearance was given to the building.



Incineration at Columbus, Ohio Replaces Garbage Reduction

Change-over in disposal method requires education of public to supply city collection service with combustible rubbish heretofore rejected—Incinerator design includes two 75-ton furnaces with watercooled basket grates.

By Edward A. Ramsey
Designing Engineer, Department of Public Service, Columbus, Ohio

FOLLOWING A TWO-YEAR study of municipal waste disposal prompted by the excessive cost of maintaining an old garbage reduction plant, the city of Columbus, Ohio, adopted incineration as the most effective method for handling its daily refuse and with the aid of PWA funds constructed a 150-ton plant that has been in operation since December, 1935. This unit, the first of four plants that will ultimately serve the city as the need for additional facilities arises, includes two furnaces each of 75 tons capacity per 24 hrs. and appurtenant equipment all housed in a concrete- and brick-structure with architectural lines patterned after the modern motif.

It is of interest to report that the change-over in disposal methods has brought with it a problem in connection with the collection of refuse. For a period of 25 years prior to the introduction of incineration all garbage was collected separately and great pains were taken to keep out foreign matter such as paper, rags, corn husks, etc.; this resulted in the development of private scavengers who removed household rubbish for a small sum in order to obtain various reclaimable materials. Now the city is faced with the task of educating the public to include with its garbage all combustible material, and to acquire this material without interference from private scavengers. In the near future it is expected that municipal legislation will be passed to control the collection of combustible refuse.

In 1931 the city was confronted by the fact that its reduction plant, instead of producing an income or at least being self-supporting, was costing an excessive amount to operate and had become such a burden that some change was necessary. This state of affairs arose from several causes. The plant was put into operation in 1910 and, although repairs were continuously being made, the time had arrived when it was imperative to replace important items of equipment and to make major changes in the buildings. The garbage was brought from all sections to a transfer station in the center of the city, dumped into railroad cars and hauled four miles to the reduction plant. The cost of this haul and maintenance of trackage was excessive, amounting to about $10,000 per year. The market for tankage and grease products had fallen off and showed no signs of recovery. In addition, odors from the chimney were creating a nuisance in that section of the city nearest the plant and there were many complaints.

The administration and council started an investigation in 1931, in the course of which incineration was discussed, several plants visited and this method finally decided upon as more satisfactory and less costly than the reduction process. After further study it was concluded that to facilitate collection and disposal in a city which had grown up generally in the shape of a cross, four plants should be built, one in each section of the city.

When the city officials were considering projects possible of inclusion in its contemplated P.W.A. program, it was decided to include two incinerators in one project, one to serve the south half and the second the north half of the city until such time as additional growth should indicate the necessity for plants in the east and west sections. A bond issue, including this and several other projects, was submitted to the voters and passed at the election in November, 1933. Government requirements were met and work on the project was ready to start early in 1934.

Basic data and site selection

Records of tonnage of garbage collected and percentage of variation during different months of the year were kept over a period of twenty-one years. It was found that the peak daily tonnage for a thirty-day period was 190 in September, 1931, and the minimum 38 in March, 1917. Collection averaged 94 tons per day over the twelve-year period between January, 1922, and December, 1933. The average variation monthly was between 70 per cent in February and 140 per cent in September. No figures on the amount of rubbish produced were available since no rubbish collections had been made in the past. It was therefore assumed that the same conditions would apply in Columbus as in other American cities of the same size and type, and that the combined refuse could be counted on to be composed of 65 per cent garbage and 35 per cent rubbish by weight. The population of Columbus is approximately 300,000.

As a result of a study made of collection maps and based on conditions and features peculiar to the city, it was decided to build a 150-ton plant south of the center of town and a 100-ton plant in the north end. The dividing line between the two sections was set by railroad lines and yards running east and west through the city. Collection maps showed that 60 per cent of the total garbage was produced south of this line and 40 per cent north. It was felt that with a total capacity of 250 tons, the city could handle the peak conditions and normal increases for some time.

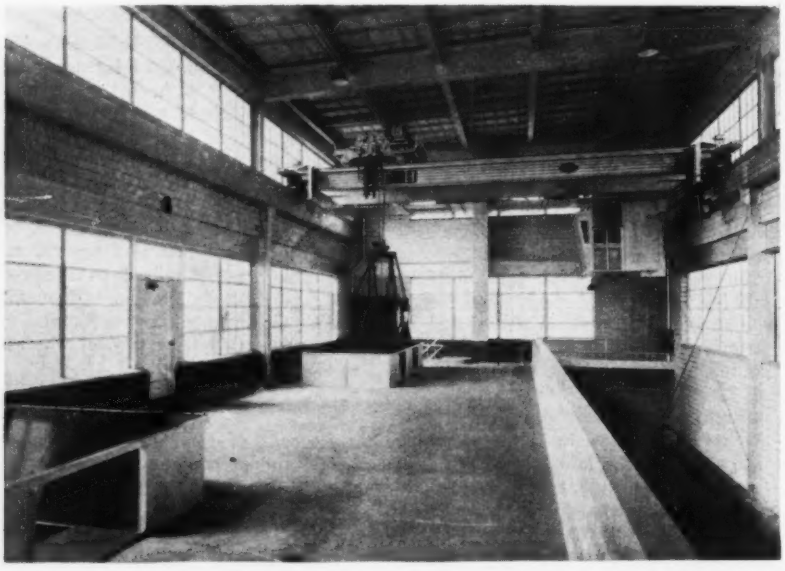
The site selected for the south or, as it has come to be called, the Central plant was on city-owned property directly in front of the old garbage transfer station and within one city block of the center of collection for the district. Since the appearance and maneuvering of garbage trains about the site had been a daily occurrence for a number of years, no objection was made to the placing of the new plant there. The site selected for the north incinerator was in an industrial district, close to a railroad and within four blocks of the center of collection in that district. However, due to the fact that a residential district was located across the tracks to the west of the site, a great deal of objection arose followed by much oratory and threats of injunction suits. Finally the city officials abandoned this site and selected one on city property in an old stone quarry outside of and to the northwest of town.

Furnaces specified to fit building

In preparing drawings and specifications for the Central plant, which was started first, it was decided to confine the city's drawings to those for the building, specify the equipment thoroughly and allow legitimate manufacturers to bid on their own furnace designs within the limit of the specifications and submit their drawings with the bid. Alternate proposals redesigning the building by bidders to adapt it to their particular shape of furnaces was forbidden, since it was thought that permission of this kind would weaken the specifications, lead to unnecessary arguments and possible misunderstanding before and during construction and give advantage to one or another bidder, which in the hands of an unscrupulous party would inevitably be to the city's disadvantage. This decision made the design of the building rather difficult since plan sections through the different furnaces varied widely. Information on the floor space required by equipment was procured from a number of manufacturers who had several plants in operation. These data were assembled, furnace plans drawn on cardboard and cut out and the plan of the building was developed so that any one of the four major types of furnaces could be built therein. Those considered were the circular furnace, the basket-grate, the dual hearth and the multiple-cell mutual assistance types.

All of the furnaces above referred to are charged from the top and the material may either enter the building at a level above the furnace where it is then dumped direct or fed by hand, or it enters the building at a low level, where it is emptied into a pit and transferred by a crane and bucket to hoppers above the furnace. The site selected determines the method of handling. If the plant is built on a hillside, gravity feed is indicated but if it must be erected on a level site, the crane and bucket method is preferable. The site selected for the Central plant was practically level and sufficiently close to the Scioto River, which runs through Columbus, to prevent a deep basement. Consequently, a crane- and bin-type building was selected. Refuse is brought to this building on a driveway which leads from the street to a tipping platform in front of three receiving doors and dumped into a pit which has a total capacity of 100 tons. From the pit the material is raised by means of an overhead traveling crane to the charging space over the furnaces and deposited in hoppers, where it is fed into the furnaces. The ashes are removed from hoppers below the furnaces which dump directly into trucks.

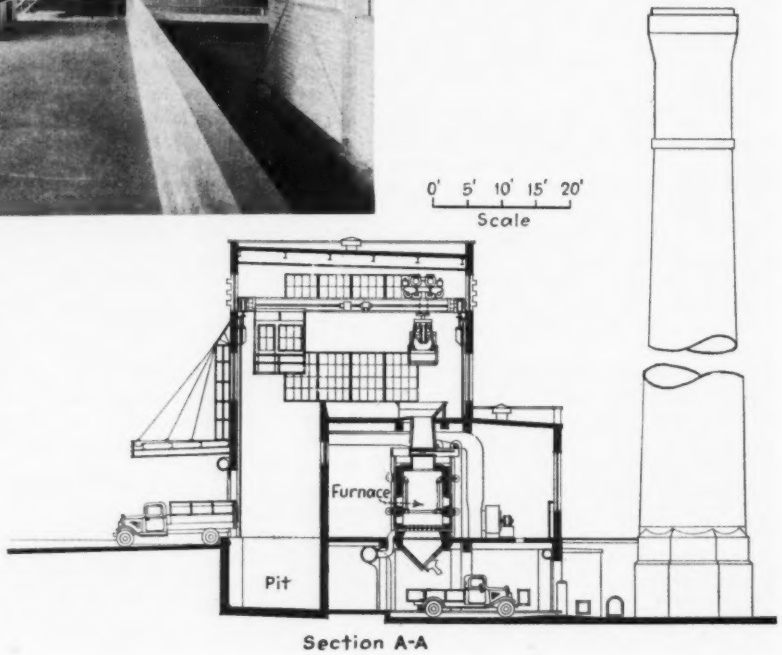
STEEL HOPPERS over each furnace on the charging floor are filled with a bucket from the 100-ton refuse storage pit below the tipping platform. Note the concrete guard wall and the raised sides of the hoppers which provide safety to workers.



Details of incinerator building

The incinerator building houses two furnaces and is 50 ft. wide, 90 ft. long and 45 ft. high from the tipping platform to the parapet coping. The base-

THE LAYOUT of the Columbus incinerator expedites refuse reloading, furnace charging and ash removal operations.



Section A-A

ment is 11 ft. below the tipping platform. Basement walls and the partition between the furnace room and the storage pit are concrete; the floor and walls of the pit are armored with steel rails. All other walls are of brick, faced on the exterior with light buff face brick and on the interior with sanitized units having a glazed light ivory surface. Interior walls can be easily cleaned by sweeping or hosing. Wherever walls or door openings are subject to damage from trucks they are armored with steel angles and plates. Floor construction is of reinforced concrete and structural steel.

The flat roof is built of precast concrete slabs carried on steel beams and purlins and covered with a tar and gravel surface. A steel canopy is provided over the tipping platform across the front of the building. The scale shed is built of steel and concrete with a reinforced concrete slab roof covered with tar and gravel. Bifolding steel doors are used at the scale shed and rolling steel curtains on the receiving doors at the tipping platform and truck entrance doors in the basement. All other doors throughout the building are also of fireproof construction.

The weighing scale is a 15-ton unit with dial reading in the office, located directly back of the scale shed. The traveling crane is a 3-ton model with a 1½-yd., power-wheel type, clamshell bucket. The chimney is 140 ft. high and 8 ft. inside diameter from top to bottom. It is built of an outer shell of radial brick with a separate firebrick lining, the entire height of chimney, supported by a steel corset.

The furnaces are designed to incinerate a refuse mixture composed of 70 per cent garbage and 30 per cent combustible rubbish, having a moisture content of 50 per cent. Each furnace has a specified capacity of 75 tons per 24 hours. They are Decarie type, top feed, with water-cooled pipe-drying baskets, cast-iron grates capable of being dumped over the entire area, and water-cooled cast-steel door linings. The walls are built of 9 in., first quality, refractory brick, backed up with 4½ inches of insulating brick cased with steel plates. Customary buck-stays are provided. The roofs are flat-arch construction, using refractory blocks supported from steel beams, the whole covered with steel plates.

Refuse is deposited in steel-plate hoppers on the charging floor. These hoppers are connected to the furnace tops by means of two steel containers for each furnace; each container has a storage capacity of 1½ cu.yd. The openings between the containers and the furnaces are closed with hand operated, refractory-lined gates. These gates move horizontally and drop the charge through a hopper into the basket grate of the furnace where it is dried and the initial combustion takes place. It then passes to the burning grates where it is reduced to an inorganic ash.

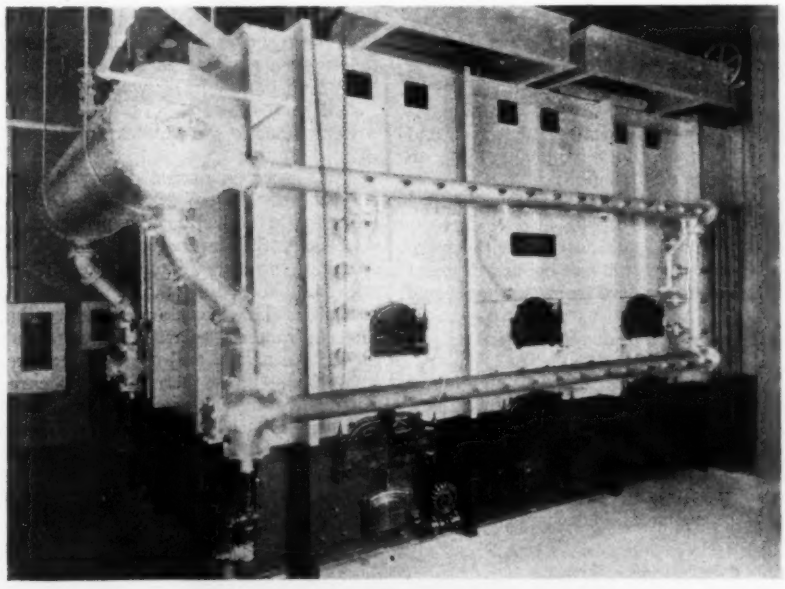
Each furnace was required to have a net effective grate area of 90 sq.ft. which was predicated on a burning rate of 70 lb. per sq.ft. per hr. Drying-hearth area equal to one-half the grate area was specified but this was supplanted by the basket grate in these furnaces; each basket has a horizontal area equal to that specified for the drying hearth.

Three steel ash hoppers under each furnace are lined with paving brick and provided with quenchers. Ashes are dumped into trucks through dust- and water-sealed gates in the hoppers.

Preheater and forced-draft system

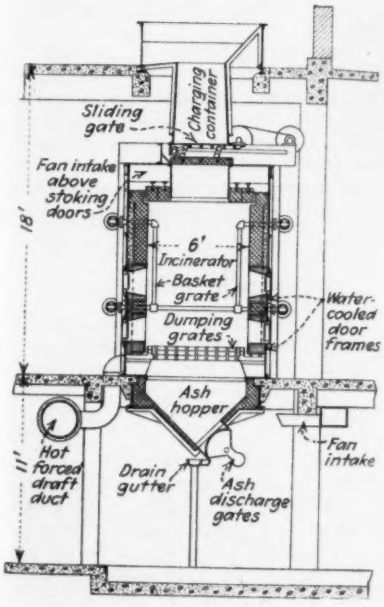
The burning gases pass the length of the furnaces and over bridge walls into combustion chambers which are built of similar construction to the furnaces themselves. Each chamber has a volume of 1,050 cu.ft. and extends from the basement floor to the furnace tops. It is designed to roll and mix the gases and retard their passage to the chimney sufficiently to induce complete combustion. From these chambers the gases pass through preheaters built of banks of refractory blocks with horizontal openings for the passage of gases and vertical openings for the passage of air. They are designed to heat the forced-draft air to temperatures ranging between 300 and 400 deg. F. This type of preheater, while it heats more slowly than the usual type made up of a number of cast-iron or steel tubes, has the advantage of being affected less by quick temperature changes in the furnaces and maintains the air at a more even temperature. It is believed that this heater will be affected less by expansion and contraction and will outlast the metal tube types. After leaving the preheaters the gases pass through flues of the same construction as the combustion chambers to a single header flue and thence to the chimney. Dampers are provided in the flues for controlling the velocity of the gases and traps are introduced throughout the system to collect fly ash before it reaches the chimney.

Forced draft is required for the successful operation of refuse furnaces because a large amount of air is required



FURNACE FRONT showing piping details of the circulating water system connected with the basket grate and door frames.

CROSS-SECTION of the furnace assembly showing the position of the basket-grate under the charging container. A hand-operated sliding gate controls the amount of charge.



to dry and burn this high moisture content material. The air supply is made more effective when heated before being introduced into the furnace but too high a temperature will cause the grates to burn out. In this plant air for induced draft purposes is collected from three different locations about the building. One inlet for each furnace is provided to draw air from above the storage pit, one takes air out of the stoking spaces about the furnace and the third is located at the ash hoppers. This system utilizes a fan connected with each furnace capable of delivering 5 lb. of air per pound of refuse burned.

The inlets in the stoking space occur at the furnaces themselves. As mentioned before, the furnaces are roofed over with steel deck plates leaving an air space between the top of the refractory arches and the plates. Openings were left in the side casing close to the deck and the fan intake duct is connected to the top of the furnace so that air is drawn from the space around the furnaces through these side openings, across the top of the arches and through the duct to the fan. This method provides positive air circulation over the arches and consequently positive cooling. It also raises the temperature of the air delivered to the preheater and thus has a less cooling effect on the preheater refractories than if the air were delivered at room temperature.

The intake duct over the storage pit collects the polluted air in that area and prevents foul odors from spreading to other parts of the building.

When an ash hopper is being dumped a damper in the intake duct close to it is opened and all dust is withdrawn, thereby keeping the ash collection space in the basement free from dust nuisance.

Appurtenant equipment

A system of signals, composed of electric lights, bells and speaking tubes, is installed between the stoking floor and the charging floor, and between the stoking floor and the basement. By means of these the type of material fed into the furnaces including the timing and amount of the charges may be controlled, and the forced draft under the proper part of the grates shut off when an ash hopper is being emptied.

Recording pyrometers, one for each furnace, are located in the office in addition to the indicating pyrometers in the stoking room. These instruments indicate the temperature of the gases in the combustion chambers and the temperature of the forced-draft air as it leaves the preheaters.

A steam heating system is provided with radiators in the office, locker room and toilets but the balance of the building is without heat. Inasmuch as the type of furnace to be installed was unknown at the time the plans were drawn and it was necessary to have heat in some parts of the building on days when the plant was shut down, this system was made independent of the furnaces. With a type of incinerator that produces steam at low pressure (15 lb.), a connection can be left so that the heating system may be connected to it. It was found after operation had begun that with these furnaces and the method of collecting forced draft air installed, there is practically no heat loss from the furnaces. Consequently, it is intended to provide radiators in the basement, stoking room and on the charging floors to heat these spaces in cold weather, using the steam generated in the drying basket which is now being wasted.

Performance guarantees and tests

Tests were conducted during the latter part of November, 1935. Due to difficulty in collecting the proper kind of refuse, the testing operations consisted of burning 75 tons in each furnace and recording the time required and other data necessary to prove that the contractor's guarantees were fulfilled. An appeal was made in that section of the city where there appeared a tendency to wrap garbage and to a number of local manufacturers to send their combustible waste to the new incinerator. Fair cooperation was had but due to new conditions and the time of the year, it was impossible to conduct the tests over 24-hour periods. Generally, the guarantees set up in the specifications were as follows:

1. That each furnace would incinerate 75 tons of the mixed refuse (consisting of 70 per cent garbage, 30 per cent combustible rubbish, total moisture 50 per cent) in 24 hours.

2. That this would be done without discharging any objectionable odors or dust from the chimney.

3. That any smoke discharged would be of a degree of density and darkness not greater than No. 1 on Ringleman's smoke chart.

4. That the refuse would be reduced to a clean, nuisance-free ash.

5. That an average temperature of 1,450 deg. F. would be maintained in the combustion chamber during the test period.

6. That the preheated air temperature would be steadily maintained at 300 deg. F.

During the test period each of the furnaces showed an incinerating capacity of 128 tons in 24 hours and maintained an average temperature of 1,496 deg. F. A burning rate of 120 lb. per sq.ft. of grate area per hr. was developed where 70 lb. was anticipated in the specifications. No dust or objectionable odors were observed from the chimney or about the building and rarely was there any smoke as dark as No. 1 on the Ringleman chart. The ash produced was satisfactory.

It was also found that due to the furnace design, which placed new material in a space separate from the grates, the burning-down period was greatly reduced over the ordinary furnace, the average time required to clean and dump the grates was 2½ min. and that it was not practicable to operate the fan at top speed. The lighter bed on the grates in this type of furnace permits greater ease of air travel through it and the pressure usually required is thereby reduced.

The crew required to operate the Central plant includes a foreman, weighmaster, crane operator, charging-floor man, four firemen (two for each furnace), one ash man who also drives the ash truck, and one clean-up man. This crew is about ten men less per shift than was required to operate the reduction plant.

TABLE I—TABULATION OF 75-TON TEST RESULTS

Date of Test 1935	Unit Tested	Duration of Test (Hrs.)	Amt. Rubbish burned during test period.		Rated Capacity Tons per 24 hrs.	% over capacity	Burning Rate		Mixture			Ash—% Inorganic	Odors from stack	Dust from stack
							Test	Spec.						
			Lbs.	Tons			Lbs. per sq.ft. grate surface per hour	Lbs. per sq.ft. grate surface per hour	% Garbage	% Rubbish	% Moisture			
Nov. 21....	North	7	82,020	41	75	87	130	70	70	30	51.3	95.25	None	None
Nov. 22....	North	4	42,000	21	75	66	116.6	70	70	30	51.3	91.25	None	None
Nov. 23....	North	2.5	26,000	13	75	66	115.8	70	70	30	51.3	.....	None	None
Nov. 27....	South	8	88,190	44	75	75	122	70	70	30	51.3	87.5	None	None
Nov. 30....	South	6.5	64,000	32	75	58	109.4	70	70	30	51.3	92.25	None	None
Total.....	.....	....	302,210	151	....	....	.....	.....	....	....	.....	.....	.....	.....
Average....	.....	....	.....	.....	....	71	119.8	70	70	30	51.3	91.5	None	None

Direction

The preparation of drawings and specifications, and the supervision of construction of the incinerator were made by the Division of Engineering and Construction of the City of Columbus under the direction of Paul W. Maetzel, chief engineer, and John H. Gregory, consulting engineer; the writer was in direct charge of the project. The building was erected and the incinerators furnished and installed by the Decarie Incinerator Corporation of New York City at a cost of $118,000.

Practical Soil Mechanics at Muskingum—III

Resisting Strength of Foundations

By Theodore T. Knappen and Robert R. Philippe
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AS WAS BROUGHT OUT in preceding articles (*ENR*, March 26, 1936, p. 453, and April 9, p. 532), the foundations were of questionable character at the sites of several of the Muskingum dams. The valley fills on which it was proposed to locate many of the embankments consisted of poorly consolidated clay and silt. Where these conditions existed, tests were undertaken to determine definitely the behavior to be expected under the proposed loadings. The plan deserves some emphasis.

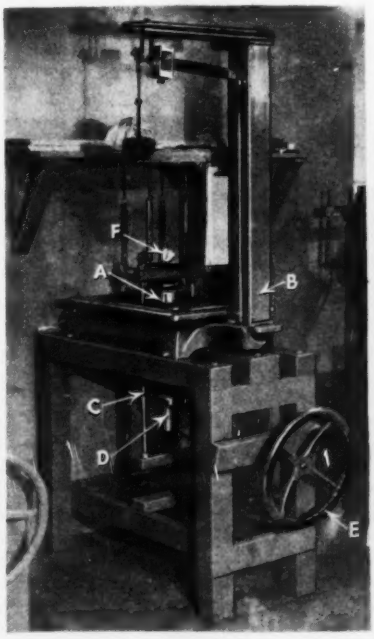
In the discussion of permeability and seepage in the previous article, the intimate relation between the laboratory tests and the design was pointed out. The same objective was held to in the foundation-strength design studies. Here the aim has been to put the structural design of the foundations on a rational basis, utilizing the excellent work of previous research and developing a technique for applying its results to the solution of practical problems. The work has gone further and adopted from the field of modern structural design the photo-elastic method of stress analysis and applied it to foundation problems. The assumption has been throughout that there is a rational or experimental method for answering every foundation problem. It is realized that only a beginning in this work has been made, and that much that is being done will be greatly altered and improved as the technique is taken up and applied in general practice. There are problems in embankment and foundation design for which as yet there are no solutions; some of these are being worked on here, and others are being attacked in other laboratories, but to the fundamental problems the solutions are now at hand.

Settlement is first problem

Consolidation is the process of increasing the density of a soil under applied loads. Volume tends to decrease as load is applied and as water in the voids is squeezed out. Where materials are saturated, which is the usual case in foundations, the rapidity with which consolidation takes place depends on the drainage characteristics of the material and the foundation in general. Ultimate consolidation on this project is considered practically instantaneous for some foundations, and for others it is estimated in periods of years; in one case the estimate is 99 years.

It is desirable to know the total amount of foundation consolidation that will take place under the proposed load and the amount of this that will take place during construction, as the difference between these two figures should be added to the height of the embankment at the time of construction so that, when the eventful consolidation has occurred the embankment will not be below the designed crown grade. It is necessary to know the rate of consolidation during construction to determine in advance what shearing strength the foundation material will have developed at the time any particular load is applied. Ordinarily we need not consider any granular material, such as sand or gravel, as the strains of these materials are comparatively small, and consequently the consolidation is also small and takes place rapidly during the construction period. We are interested, therefore, only in materials of the silt and clay type.

FIG. 11—CONSOLIDATION test machine made up of purchased parts proved highly superior in operation and has been widely copied. The loading device consists of an ordinary 1,000-lb. platform scale. The consolidation device (A) is set on the platform scales B. The floor of the scale is bored with two holes through which pass the two arms of a yoke C, which applies the load to the consolidation device. The load is applied to the bottom of the yoke by the jack D, which is a 2½-ton screw-type high-grade truck jack. The jack is actuated by the hand wheel E. The lever arm of the scale is counterbalanced for the load which is to be applied. The hand wheel D is manipulated to get the balance arm of the scale in horizontal position. The stop is removed from the balance arm of the scale, so that as deformation of the specimen takes place under the load the applied load will not change but the difference will be taken up in the movement of the scale platform as reflected in the movement of the arm. The amount of consolidation of the sample is measured by the dial gage F.



The consolidation characteristics of a foundation may be determined by taking undisturbed samples of the various strata of the materials occurring in the foundation and testing them. The tests are carried out in consolidation machines (Fig. 11) designed and built in the laboratory; these machines were assembled from platform scales, truck jacks and dial gages, which permitted their construction at a very low cost yet gave machines that are sufficiently accurate for all practical purposes. The purpose of the machine is to apply uniform and unvarying loads to a specimen for any desired length of time, often for several days, and to be able to change the intensity of the load at will. The specimen is placed in a bronze ring, 1¼ in. in depth and 4¼ in. in diameter; it is carved out of an undisturbed sample of the material to the exact size of the inside of the ring (the ring being used as a templet). Porous stone disks of slightly smaller diameter than the diameter of the ring provide drainage at the top and bottom surfaces.

To determine the consolidation characteristics of the specimen in the consolidation service, it is necessary to apply and maintain any desired vertical load on the sample. The desired load is set on the arm of the 1,000-lb. platform scale used, and the load is applied to the sample by a 2½-ton screw-type high-grade truck jack through a yoke. The stop is removed from the scale arm, permitting it to move as deformation of the specimen takes place, thereby maintaining a uniform load. The scale arm is brought back to the horizontal from time to time by taking up on the jack. The amount of consolidation of the sample at any time is measured by the reading of the dial gage.

The general results of these tests fix the time rate of consolidation and the stress-strain relationship of the particular sample considered. To illustrate, if the specimen from a stratum consolidated 5 per cent under a load equal to the proposed load over the particular stratum which was 10 ft. thick, then the stratum would ultimately consolidate 5 per cent of 10 ft. or 0.5 ft. due to the embankment load. By determining the consolidation for each stratum in this way and adding them together, the total ultimate consolidation of the foundations under the embankment may be determined. Further, since rate of consolidation varies within limits as the square of the distance between drainage boundaries and assuming that the 10-ft. stratum is underlain by a free draining material, consolidation of the stratum will take $\frac{120^2}{1.25^2} = 9210$ times as long as it did on the sample. If the consolidation of the sample took ten hours, that of the stratum would take 92,100 hours, or 3,840 days, or 10½ years. By similar methods the amount of consolidation at any time may be determined. Thus, from these results the amounts of settlement anticipated during construction and after construction is completed may be fixed with reasonable accuracy.

Stress-strength relationship

The next problem to be handled is to determine the stress-strength relationship in the foundation of the proposed embankment. First, the shearing strength of the foundation materials is determined. After that is done, the embankment must be so designed as to keep the stresses well below the strength of the foundation material. In studying foundation sections where silt or clay type material containing a high moisture content are found, tests should be run to determine the shearing strength of the various foundation materials. For these tests, as for the consolidation tests, it is necessary to have undisturbed samples of material. Ordinarily specimens from the same sample are used for both tests. Sand and gravel materials generally are of no interest in this connection, as they consolidate as the load is applied and develop high strength. In silt and clay type materials it is comparatively easy to obtain undisturbed samples, as these materials are naturally impervious and test pits can be put down through them with very little pumping. Specimens for making the test to determine the shearing strength of these materials may be cut from the undisturbed samples obtained from the foundation.

A special shearing machine (Fig. 12) was designed in the laboratory to make these tests. Two things are desired in the shearing machine: one is means of applying the vertical load uniformly during tests, and the other is a means of applying and measuring the shearing load. For the construction of this machine, as for the consolidation machine, standard manufactured articles were utilized. The shearing box that holds the sample consists essentially of top and bottom sections that are kept from contact with each other by the sample. The box is set on a 1,000-lb. platform scale, and the vertical load is applied as in the consolidation machine. The shearing force is applied to the bottom section of the box by a second jack set horizontally. The total shearing stress induced in the specimen is transferred from the top half of the box through a yoke to a bellows. The pressure on the bellows is measured by a manometer. The desired vertical load is applied by setting the scale arm, and equal horizontal strains are applied by the horizontal jack in increments of 15 sec. so that a complete shear will occur in 4 min. This rapid rate of load application tends to eliminate consolidation during the time of test in so far as it is possible to do so.

Several specimens, 4x4x⅞ in., carved from each undisturbed sample are tested at different vertical loads, so that the variation in shearing strength with the vertical load applied can be determined. Fig. 13 shows the shear curve determined by tests on specimens from one sample. The strength at zero vertical load can be defined as the cohesion, and the slope of the line gives the apparent angle of internal friction.

It may be observed that during construction of an embankment a certain

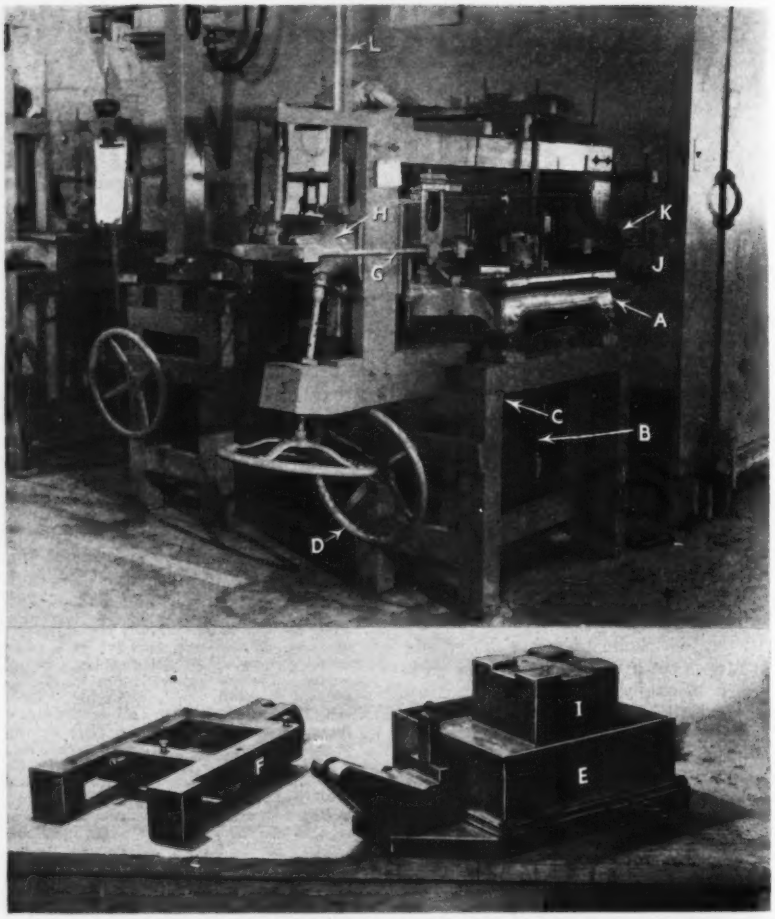


FIG. 12—SHEARING TEST MACHINE with enlarged view of shear box and specimen after test; laboratory was constructed at a cost of $400. The shear box is set on platform scales H, and the vertical load is applied through yoke B motivated by jack, operated by hand wheel D. A shearing load is applied to the bottom half of the shearing box E by means of yoke G, motivated by jack H. The top half of the box is connected by means of yoke J to bellows K, which is connected in turn to manometer L, which measures the intensity of the shearing stress in the specimen. The top section F of the shearing box has a 4-in. square opening through it, and the bottom section E has a similar opening recessed 9/32 in. into it. In this recess at right angles to the direction of shearing strain is a series of parallel ribs used to grip the bottom of the test specimen. The undisturbed test specimen is cut from the sample 9/16 in. thick to fit exactly the opening in the shear box. The top half of the shear box F is set down over the sample, but contact between the two halves of the box is prevented by set screws. Through the opening in the upper half F a bronze piston, which is corrugated on its bottom surface in the same manner as the recess in E, is pressed into the sample and locked in place by set screws. The clearance screws holding the two sections of the box apart are then released, as the sample now serves that purpose. The box is now ready to insert in the machine.

amount of consolidation does take place in the foundation, which in turn would tend to increase the shearing strength of any particular sample. However, no testing method so far devised has been able to take this factor fully into account, and the only approach to the problem is to test under the assumption of no consolidation during construction and reproduce the effect of consolidation as effective load applied in a given time. This factor induced into the shear relationship as an increased vertical load will give the minimum increased strength due to consolidation and therefore is a conservative analysis. Hence, with the shear relationship fixed it becomes necessary at any given time to estimate the vertical load effective on the material under consideration.

As a preliminary explanation, it is well to point out that while at the time of instantaneous application of load the principal stresses are carried entirely by water (assuming the material to be saturated), the resulting shear stresses must be carried by the grains themselves. As time progresses, the water being under pressure is forced out at a rate depending on the thickness and permeability of the material, and as a result the principal stresses are transferred to the soil particles themselves. As these stresses become effective the material itself increases in shearing strength. To be exact in testing, it would be necessary first to fix the consolidation and the resulting permeability relationship in the prototype and simulate that condition in the testing of individual samples. Since this procedure so far has not been developed, the accepted method is a safe approximation.

Determining foundation stresses

The characteristics of the foundation material having been experimentally determined, it remains to determine what stresses will be induced in the foundation under the proposed embankment design. Fig. 14 shows a triangular embankment load. The maximum loading on the foundation is from the crown of the embankment marked *A*, and zero load is applied at the toes *B* and *C*. The difference in load, between the load at *A* and the zero load at *B* or *C*, must be taken up as shear in the foundation. There have been two cases for which shearing stress in foundations have been worked out:

1—For an infinite depth of questionable material in the foundation: For practical purposes, infinite depth may be defined as depth equal to or greater than the base width of the embankment. For large embankments this formula rarely has any application. Dr. Jurgenson, in the *Journal* of the Boston Society of Engineers, Vol. XXI, No. 3, July, 1934, developed this from an application of Corruthers formula. The equation for maximum shearing stress is

$$c = 0.256\ p$$

where c equals the maximum shearing stress, and p equals the intensity of pressure at the center line.

2—The more usual case is where the depth of questionable material is much less than the base width of the embankment. For the case where the depth of questionable material does not exceed one-tenth of the base width of the embankment, Jurgenson has developed the following formula:

$$c = \frac{pa}{L}$$

where c is the stress, p is the pressure developed by the maximum height of the embankment, a is one-half the depth of the questionable material, and L is one-half the base width of the embankment.

Between the limits covered by the two equations mentioned above, no simple analytical solution has been developed for stress determinations in the foundations. Recently an involved solution has been developed by Jurgenson from the fundamental equation defined by Corruthers, but it is so unwieldy that it must be eliminated from practical use and can be best applied to check the experimental methods herewith proposed. The Jurgenson formula for the limited case does not give the location of the maximum stress zone in the foundation. To be safe in applying the formula, it must be assumed that maximum stress occurs where the questionable material is weakest. To apply this method then, it is only necessary to have the embankment dimensions for substitution in the above formula, to get the maximum stress. Knowing the shearing strength of the material, the factor of safety against failure under the worst combination of conditions is a matter of simple division.

Photo-elastic stress determination

It must be noted that the formulas given above apply in limited cases only and also apply only to triangular embankments. The analytical solution has not been developed for other than triangular embankments or for cases beyond those limits. For the purpose of checking the analytical application of Jurgenson's formula and to develop methods to work out cases not covered, a photo-elastic method of determining stress distribution experimentally was developed in the laboratory. Gelatin was used as the foundation medium, and the embankments were constructed of lead shot, as this material was found to be the only commercial material heavy enough and suitable to give the desired results.

The well-established principles of photo-elastic analysis were applied in these experiments. Fig. 17 is a photograph of a test showing the distribution of shear stress contours. With the experiment described above, it is necessary in each case to run a calibration test where a known shearing load is induced in a sample of the gelatin material cast at the same time as the model material, in order to determine the contour interval of shearing stress for the material at that particular age. Having determined the contour interval, the maximum stress may be determined by counting the contours to the point of

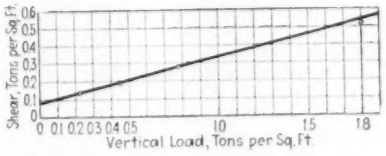


FIG. 13—SHEAR TESTS were made on each sample at several vertical loads. Curve shows results of tests on one sample.

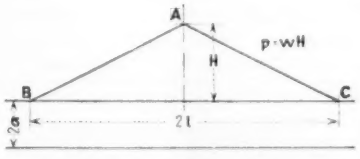


FIG. 14—DIAGRAM OF TERMS used in Jurgenson formula for stresses in foundations under embankment load.

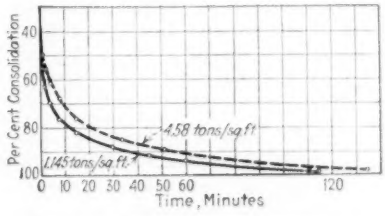
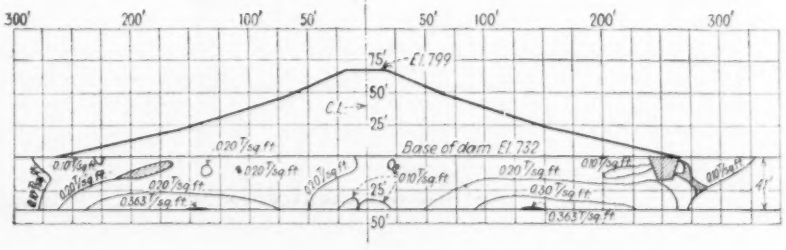


FIG. 15—TIME-CONSOLIDATION test curves at Clendening Dam, used in determining rate of construction of embankment.

FIG. 16—DISTRIBUTION OF SHEAR STRESSES in dam foundation (Wills Creek) established by operator's sketch from photo-elastic test shown by Fig. 17.



greatest stress and multiplying the number of contours by the contour interval. The results of the experiments are recorded by photographing the image of the model produced by the polarized light, Fig. 17. At the same time, a color sketch is recorded by the model operator from which the stress distribution is developed as shown by Fig. 16.

From the intensity and location of the maximum shearing stress in the model, the intensity and location of maximum shear in the prototype may be determined. To check the results of the model experiments against the analytical solution, a number of cases were worked out for triangular embankments. In about a dozen check tests the maximum variation between the results obtained by the two methods was 19 per cent, and the average variation was 6 per cent. As this variation is well within the limits of the factors of safety adopted for use, it is believed that entirely reliable results can be obtained by the experimental method where the work is carefully done by an experienced personnel.

Gelatin was the only photo-elastic material which we were able to discover that would give the proper relations for modal study. The difficulty in using any other material develops because all other photo-elastic materials which we could locate were too high in strength to develop sufficient stress contours within the limits of embankment loads that could be applied readily in the laboratory. As it was, it was necessary to go to the heaviest material obtainable in commercial quantities; that is to say, lead shot, for embankment construction in the models.

It must be noted that the methods of stress analysis are based upon the assumption of elasticity. It is not within the scope of this article to develop the validity of such an assumption. It suffices to point out that in investigating the foundations of various conditions, each a borderline case, the results of tests indicate what was known to be an actual condition—i.e., failure or stability. The conclusion drawn from these investigations was that the error of such an assumption was well within the accuracies of such work. The analysis also provides against the overstress of any portion of the foundation. When such a condition exists that at the point of maximum stress the material has just sufficient strength to balance this stress the remainder of the foundation is understressed and capable of more load than is at present exerted upon it. The addition of shear stress would cause a redistribution of stress to the understressed portions of the foundation. Only an overload of sufficient magnitude to produce stresses in excess of all the available strength of the foundation can cause a total failure. Such a failure is preceded by excessive settlements and characteristic mud waves at the toes. Final failure is characterized by a blow of the foundation and a sudden subsidence of the load.

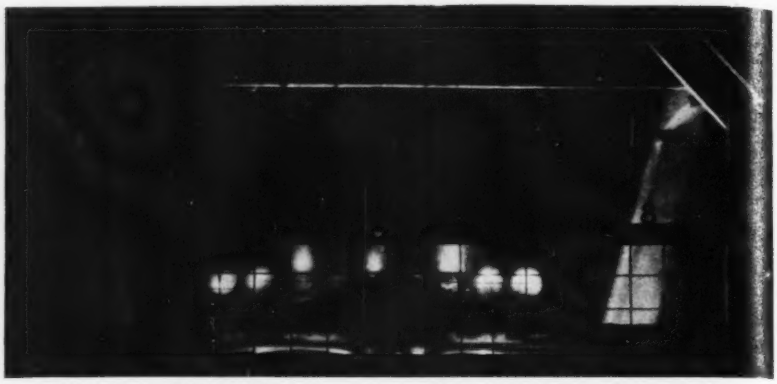


FIG. 17—DISTRIBUTION of shear stress contours in foundation of dam models (Wills Creek) disclosed by photographs of images produced by polarized light.

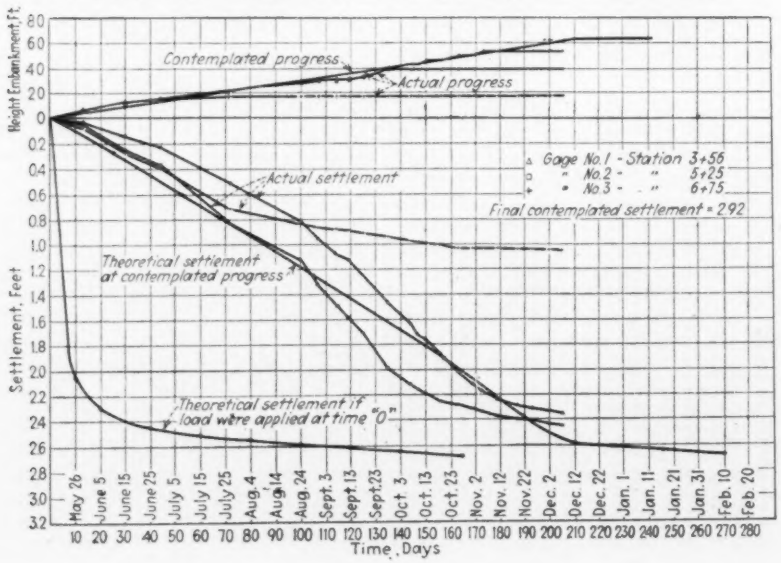
Our practice has been to design with a factor of safety of 1.5 against overstresses and an estimated factor of safety against failure of 2.6. This factor of safety may seem small, but since a progressive increase in foundation strength takes place after completion of construction due to consolidation of the foundation, the factor of safety tends to increase with time, and if the embankment can be completed there is little fear that failure will take place in the future.

It will frequently happen that tests will show that a foundation material has a very low factor of safety where the load is instantaneously applied. However, where the strata are comparatively thin or are drained by sand or gravel layers, the material will consolidate more or less rapidly as load is applied and develop increased strength against failure in shear. The time-consolidation curve indicated in Fig. 15 may be used to determine the amount of consolidation and increase in strength under the proposed method of construction, and it may be in some cases that, by limiting the proposed rate of construction, the desired factor of safety may be obtained. This is illustrated by the Clendening Dam, where the rate of construction was limited to 4 ft. per week.

For the purpose of checking the foundation consolidation during construction to be sure that the factor of safety is maintained, a system of settlement gages has been installed at several of the dams. Fig. 18 is a chart that shows the relationship between the computed consolidation during construction and the consolidation that actually took place for Clendening Dam. These charts are carefully followed during the construction period to see that the consolidation is at least as great as the computed consolidation.

In the closing article the laboratory and field methods of selecting embankment material and controlling its placement are described.

FIG. 18—RELATIONSHIP between the computed foundation consolidation during construction and the consolidation that actually took place at Clendening Dam.



After the Floods in the Pennsylvania Region

Damage in upper Ohio River watershed and Susquehanna Valley found more extensive than first realized—Cities and towns look to government for rebuilding aid and flood protection

By H. W. Richardson
Assistant Editor, Engineering News-Record

OBSERVATIONS made on a second swing through the flood-devastated regions of Pennsylvania and western West Virginia, two to three weeks after the high waters struck, reveal several outstanding facts. First, the total damage, especially to streets, roads and utilities, is greater and more widespread than was at first apparent; the early estimates of most of the larger communities were fairly accurate, but the total has been swelled by a careful survey of the smaller towns, and by reports of highway, bridge and railroad damage filtering in from the rural districts. Second, the clean-up and restoration have been unbelievably rapid and thorough; this is attributed to the splendid emergency service rendered by the WPA, CCC, Red Cross, and state highway and health departments in cooperating with municipal, engineering and health offices. Third, the flood sufferers, with little thought of doing anything themselves, except in a few isolated cases, are demanding all manner of flood protection—to be carried out and paid for by the federal government.

The extent of the flood

Hardly a town on the banks of the Susquehanna River and its tributaries which drain the eastern slope of the Allegheny mountains in Pennsylvania, escaped the flood. Wilkes-Barre, Kingston, Lock Haven, Williamsport, Sunbury, Lewistown and Harrisburg are among the larger communities that were hard hit. Many smaller towns, escaping much notice in the press, but which suffered more in proportion to size than did some of their larger neighbors, include Plymouth, Nanticoke, South Williamsport, Milton, Tyrone, Mt. Union, Newport, Duncannon and Lemoyne.

On the west slope of the mountains the Allegheny valley below Freeport, the Kiskiminetas and its tributaries, including the Conemaugh, Little Conemaugh and Stoney Creek, the lower reaches of the Youghiogheny and Monongahela Rivers were chief offenders. The Ohio caused serious trouble from its source at Pittsburgh as far south as Huntington, W. Va. Johnstown, Pittsburgh and Wheeling were hardest hit of the larger towns in the upper Ohio valley. Other communities, many of them small, suffering greatly, include East and North Vandergrift, Apollo, Cokeville, Braeburn, New Kensington, Sharpsburg, Etna, McKees Rocks, and Ambridge, Pa., Weirton, Follansbee, Wellsburg, New Martinsville, Parkersburg, W. Va., and Wellsville, Steubenville, Bellaire, Bridgeport and Powhatan, Ohio.

The fact that the rainstorm causing floods in most of the state turned to snow in the northwest corner of Pennsylvania not only saved the upper Allegheny valley from flooding, but also lessened the volume of water pouring down on Pittsburgh and other towns below. Authorities point out that had the upper Allegheny flooded, or had the floods come when the Allegheny was choked with ice, as it was only two weeks previous, the damage to Pittsburgh might have been beyond all comprehension.

Throughout the flooded areas the heaviest loss was in contents of stores and homes. Industries on the whole suffered comparatively little and, in most cases, after removal of mud, cleaning up machines and drying out motors, were able to resume full operations at an early date.

Highway and street damage

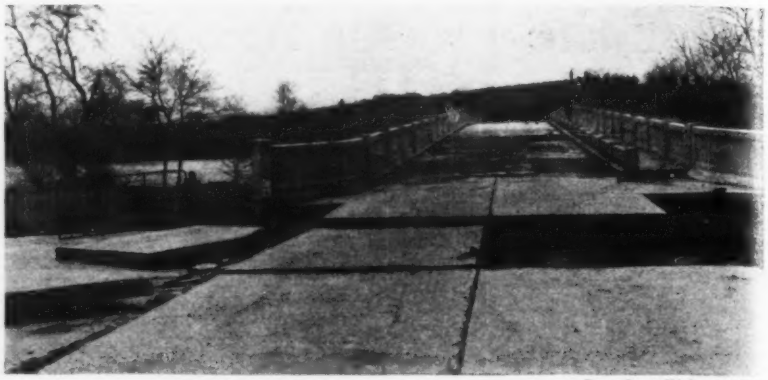
The next heaviest loss was in damage to highways, bridges, streets and sewers. The total of this loss is growing daily, as the full extent of damage becomes known. Streets at first thought unharmed are now found to be undermined, surfacing that looked sound in many cases is now breaking up due to damaged subgrades. Sewers once thought only plugged by mud are revealed as broken or washed out when investigated.

In Pennsylvania the damage to highways is found to be far beyond early estimates, as surveys are completed in rural districts and on the secondary system. At the time of this writer's visit to the state highway offices on April 6, compilation showed a loss exceeding $8,000,000, according to H. H. Temple, chief engineer. Of the main routes, the William Penn highway along the Juniata River suffered the worst damage, as miles of concrete slab were undermined, much of it beyond repair. Bridges, large and small, new and old, were washed out. In two highway districts alone 148 state bridges are out completely, and scores more are out of service through damage to structures or approaches. Indication of the extent of bridge loss is given by the fact that the Johnstown WPA district office alone has applied for state bridge projects totaling $3,500,000. At Montgomery on the West Branch of the Susquehanna, a long multiple arch concrete bridge, recently built, is a total wreck because of foundation settlement breaking every arch span. Seven large bridges on the Juniata are out. Many historic wooden bridges have been swept away, including the Juniata Crossing near Bedford.

DAMAGE to Pennsylvania's highways was varied in character, as these two views of U. S. Routes 11-15-22 along the Susquehanna at Speeceville Narrows show. On one section a reinforced-concrete river wall was torn to pieces by the flood; on an adjacent section the wall held, but the roadway was filled with stones and mud and the pavement was damaged.

Pennsylvania Dept. Highways Photos

The state highway department performed a heroic service in getting traffic routes open. This was accomplished by working the maintenance forces and equipment day and night, to fill washouts, remove debris from the highway and to repair bridges or build temporary structures where necessary. Blessed with a substantial secondary road system, the department was able to establish through routes by numerous detours over back roads. Very few temporary bridges were required, as in most cases it was possible to detour traffic to another crossing still intact. Detours were made around large washouts and other obstructions. The permanent bridge restoration program waits on financing. It is believed many of the smaller structures will be replaced as WPA projects, while the larger bridges will probably come under the federal aid program. Contracts will be let for reconstruction of all of the larger bridges as fast as funds become available.



Penn. Dept. Highways Photo

SCORES of Pennsylvania's highway bridges are completely out, and other scores were put out of service by washing out of approaches, of which this view of the approach to the Clarks Ferry bridge across the Juniata is a typical example.

Penn. Dept. Highways Photo

MAINTENANCE forces have propped up the undermined slab on the William Penn Highway preparatory to backfilling. The shoulder embankment, now entirely washed out, once extended to the end of the culvert at the right.

In West Virginia the flood damage to highways in the Ohio and Potomac valleys totals $1,830,500, according to compilations made by M. H. Smith, chief engineer of the highway department. This loss, following close behind a disastrous winter damage of $4,069,150 to state highways, leaves the department in precarious financial condition, as the total flood and frost damage is 50 per cent in excess of all possible revenues for maintenance for the entire year. On the primary system 21 bridges were lost or damaged to the extent of $600,000; damage and loss on 250 secondary system bridges totals $206,500. In addition three private interstate toll bridges between West Virginia and Maryland and Virginia were ruined, with a loss of $1,000,000.

Whether these will be replaced by private interests or by the states is not known. Traffic has been rerouted past all of the bridges not possible to repair at once, so no temporary structures have built. Damage to the roads was mostly by washouts and slides, as the surfacing that withstood the ravages of frost came through high water without further trouble. WPA projects for the bridges are being filed, and WPA will also be asked to relieve the maintenance burden. The department expects all of the larger bridges to be built by contract.

WPA aid invaluable

The work of the PWA organization in the flooded areas was outstanding. In Pennsylvania 100,000 workers with trucks, tools and other equipment were pulled off other jobs and mobilized in short order for flood relief by E. N. Jones, state administrator, Lee H. Walker, director of operations, and E. O. Morse, assistant director. Though lacking the man-power of WPA, the CCC forces in the state were mobilized almost as quickly, and the two organizations cooperated with the municipal forces. Authorities and citizens everywhere admit that without the relief-labor man-power and the organization and drive behind them, cleaning up would have been prolonged for weeks, instead of being accomplished in a few days.

In addition to the messy job of cleaning up the mud and debris, WPA assisted in many other ways, especially in furnishing labor and trucks for the Red Cross and other relief activities, and helped health authorities and building inspectors in sanitation and inspection work.

Now that the mopping up and emergency restoration work is over, WPA figures prominently in permanent rehabilitation plans. In both Pennsylvania and West Virginia blanket projects have been set up under which all flood-stricken municipalities are invited to submit local projects to cover their entire public service rehabilitation needs. Already Johnstown has presented a WPA street repair project amounting to $592,000.

Pittsburgh alone refuses to call on WPA to repair its municipal services. The mayor and department of public works have long objected to WPA operations, and though they welcomed the emergency aid, they intend to carry on the permanent restoration by city forces and by contract, though the city council shows inclination to accept the outside help.

In West Virginia 3,000 WPA workers were sent into the flood areas by state administrator F. R. McCullough to aid in cleaning up. The work in Wheeling alone cost the organization $100,000, and an additional $125,000 was spent elsewhere in the state, mostly in the Ohio valley. Permanent restoration projects aggregating $1,000,000 have been filed in the state headquarters, and work of this type amounting to $225,000 is already under way. Authorities expect to receive requests totaling at least $2,500,000 when the various municipalities are able to work up their full individual requirements. The first project filed by Wheeling was for cash reimbursement for city funds spent during the emergency period, which was promptly turned down.

Outside of Pittsburgh, probably the entire flood damage to municipal services and at least a part of the highway damage will be taken care of by WPA. The administrators are endeavoring to obtain local contributions for some of the expense, but in most of the projects filed to date full grants are being asked for, the sponsors pleading lack of funds.

WRECKAGE of the 225-ft. span Franklin St. bridge across Stoney Creek in Johnstown. The span was carried 300 ft. downstream and deposited at right angles to its original position. A temporary foot bridge now replaces the span.

To obtain a 100 per cent grant the municipality must prove inability to participate in the expense.

Water supplies, health and safety

Considering the violence and extent of the floods it is remarkable that only two large cities in the entire area suffered from failure of water supply. These two, Harrisburg and Pittsburgh, lost their supply when main pumping plants were flooded; the Harrisburg filter plant was also flooded. Separate articles covering the water supply situation in each of these cities will be published in subsequent issues of *Engineering News-Record*.

Extraordinary measures taken by state and local health authorities prevented disease epidemics, though in some communities sanitary conditions were made appallingly bad by the high waters. In most communities flooded homes and stores were not permitted to be reoccupied until thoroughly cleaned out and inspected. Lime was applied to basements and yards after being cleaned up, and lime and other disinfectants were supplied in great quantities to citizens for the asking. Hundreds of typhoid inoculation stations were set up for the benefit of citizens and workers.

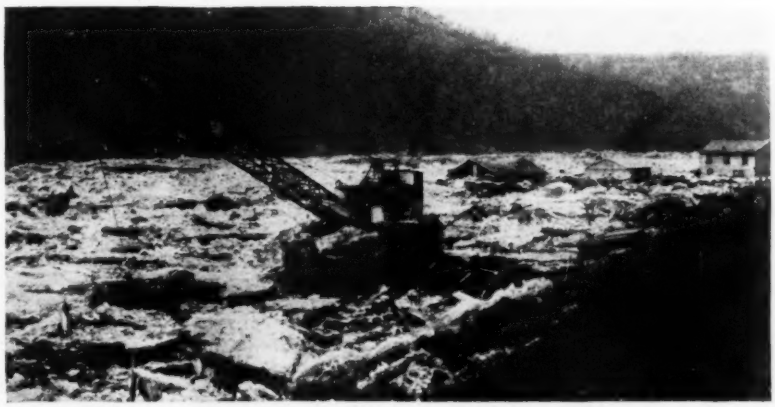
The state departments of labor and industry cooperated with municipal building inspectors. Hundreds of buildings and residences were condemned as unfit for occupancy; others were required to be repaired before being occupied; and in other cases repairs were recommended but not required. In Pittsburgh the U. S. Bureau of Mines cooperated in the inspection of buildings to determine gas leaks.

Flood control plans

Naturally, interest in flood control measures is high throughout the flooded areas. For the most part the local attitude seems to be that the government should assume the full obligation of providing protection. In the Susquehanna Valley residents and authorities regard the recommendations made in the "308" Army reports as adequate for most places. In general local dike protection is recommended in this report, and in a few instances dikes have been built or are under construction as relief works projects. Numerous flood control plans for the western part of Pennsylvania have been made by various agencies at intervals for the past half century. Probably the most promising is an elaboration or extension of the control system by fourteen reservoirs actually started last year with beginning of construction of Tygart Dam on the headwaters of the Monongahela in West Virginia. This plan included protection of the Conemaugh Valley only as far up as Saltsburg, below Johnstown, and now the U. S. District Engineer office at Pittsburgh is making studies of the Johnstown region.

The U. S. Geological Survey, under the direction of District Engineer J. W. Mangan, is making a study of the statistics of the flood throughout Pennsylvania. Data on runoff, gage heights, rainfall and discharges compiled by this study will be turned over to the state department of forests and waters and to the army engineers for flood control studies.

Johnstown took steps to hire a firm of consulting engineers to make studies and recommendations for local protection, but abandoned the plan when it was learned the army engineers were to make a similar study. Pittsburgh is talking about protecting dikes around the lower parts of the city, but engineers are not considering this plan seriously because of the impossibility of controlling seepage through the underlying gravel formation.



FLOOD damage at Pittsburgh might have been worse if this ice had come down with the high waters. This is a view below new lock No. 9, being built above Pittsburgh on the Allegheny, taken on Feb. 29, less than three weeks prior to the flood. The contractor's equipment is almost buried in the ice gorge.

Railroad lines restored fast

The manner in which the railroad lines were restored to service was remarkable. Engineering officials of the Pennsylvania R.R. at Pittsburgh expressed the plight of that road by the words "washed out in all directions." Over 500 miles of track were under water on the Pennsylvania system from below Harrisburg on the east to the Ohio state boundary on the west, and down the river as far as Wheeling. The main line between Harrisburg and Pittsburgh, and the Conemaugh Division (low-grade freight line) between Johnstown and Pittsburgh along the Conemaugh, Kiskiminetas and Allegheny Rivers, were damaged the worst. In surprisingly short time the railroad officials had mobilized armies of maintenance, bridge and signal men from places as far away as New York, Chicago and St. Louis, and attacked all points of damage simultaneously.

At many points the only requirement was to clear mud and debris off the tracks, replace washed-out ballast and fill in missing embankment shoulders. At other places the supporting embankment and even the track structure was gone, necessitating heavy filling and extensive track work, and rebuilding the signal system. The worst washout was at Barree, between Altoona and Huntingdon, where 2,000 ft. of four-track line was washed out completely, and another half mile of line was damaged. One track through this section was restored to service within three days on timber cribbing, piles and temporary fill. Below Johnstown, where three out of four tracks were undermined by the river, it was necessary to cast steel hopper car bodies into the stream to stop further bank erosion.

Fortunately, the heavier railroad

bridges stood up where highway bridges were washed away. The only serious bridge loss on the Pennsylvania was at Apollo, where the Kiskiminetas carried out five spans of a six-span deck girder bridge leading from the main line across the river to the town.

Municipal conditions

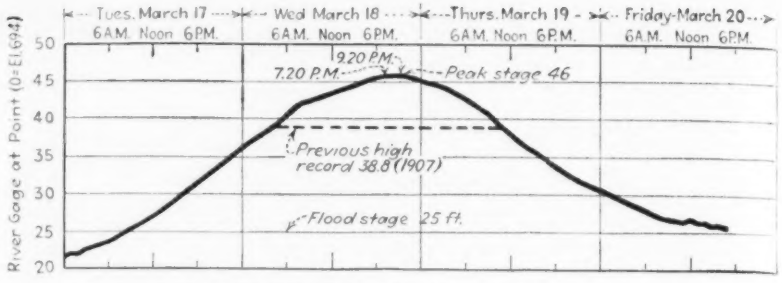
How each of the larger cities in the area came through the flood is best described by presenting the conditions found upon the second visit.

Johnstown—This industrial city of 72,000 population situated in a gorge at the confluence of Little Conemaugh and Stoneycreek Rivers was hit the hardest of any community in the entire flood area. But in spite of the precarious financial condition in which it was left by the depression, Johnstown is staging a remarkable comeback. Piles of sand, plaster and cement have replaced the piles of mud and debris along the curbs. Walking along the business streets it was noticed some stores have been completely rebuilt and refurnished. Others however are still sodden and dark, and will probably never reopen under former tenants. Most of the flooded homes not requiring extensive repairs are now reoccupied after being cleaned out by WPA and inspected by health and building authorities.

At the time of the visit, April 7, all of the streets had been cleaned, all cellars cleaned out and about two-thirds of the yards and alleys had been cleaned up. WPA forces had been reduced from a maximum of 7,000 on cleanup work to about 3,100. WPA spent $600,000 in removal of mud and debris, the forces working under the direction of E. A. James, local administrator.

Four city bridges and one bridge belonging to the Bethlehem Steel Co. were washed out, though one city structure lost only one of three spans. This bridge is being repaired, and a small flash flood on April 6 took out a cofferdam and 2,000 sandbags of the construction plant. The streams are so full of deposited material that even a small runoff at present is serious. At Poplar St. plans have been made for a temporary timber bent and I-beam stringer bridge, to replace the old steel truss that was lost. At Franklin St. a temporary foot bridge only will be built. The steel company was fishing wreckage of its bridge from the stream with a wrecking crane, and will undoubtedly replace the structure soon.

All municipal rehabilitation work, including the bridges, will be WPA projects. Under the $592,000 street project is included reconstruction of 1,000 ft. of sewers, 31,000 sq.yd. of concrete walks, 9,000 sq.yd. of brick pavement, 10,000 sq.yd. of cement macadam, to replace washed out street sections, 9,000 sq.yd. of asphalt resurfacing, 4,700 lin.ft. of concrete curb, 11,000 lin.ft. of reset stone curb, 15,000 cu.yd. of stone masonry retaining wall and 10,000 cu.yd. of cinder fill in alleys. The city also plans early removal of thousands of cubic yards of deposit from the streams, to provide waterway for an ordinary flood. Disposal of this material is a problem.



GRAPH of the flood of March 17-19 at Pittsburgh.

Williamsport—Fire added to the flood damage in this city on the West Branch of the Susquehanna River. At the time the business district was under 10 ft. of water, fire broke out in two business blocks and raged uncontrolled. The damage to Williamsport is estimated at $7,500,000 by Lyons Mussina, city engineer, including $500,000 to city buildings. The flood reached a stage of 33.9 ft., as compared with the previous high of 32.9 ft. in 1889.

The city has learned from long experience to expect double the flood height recorded at Clearfield, far above on the headwaters of the stream. When Clearfield reported 17.5 ft. of water on March 17, city authorities prepared for a 35-ft. stage. A flood disaster committee headed by local Red Cross officials and including the city officers, had already been formed during high water stages of the previous week. This committee virtually took command of the city, and through its efforts property loss was minimized.

Strangely enough, the flood at Williamsport was the cleanest on record, though towns above and below were almost buried in mud. As the waters receded much floating debris was left, but only a thin skim of mud remained. Even flushing of the streets was not necessary.

The water supply remained intact, light and power service was maintained except for three hours during the daytime. Gas service was out for ten days. Telephone service suffered severely through flooding of underground cables and the basement of the main exchange. It was found that the flood temporarily raised the ground water level far above normal, and pumping of manholes and the basement had little effect, as water seeped in as fast as it was pumped out. The telephone company claims $1,000,000 damage.

Streets, mostly brick on a substantial base, came through without damage, except that short sections of old wood block paving were ruined. No damage to sewers is reported. Garbage collection was maintained throughout the non-flooded areas as a health measure, and the incinerator took care of considerable flood refuse and spoiled products in addition to the normal garbage load.

Wilkes-Barre—This city was caught with a WPA flood control project—an earth dike to protect the lower part of the city—under construction. Flood waters swept over the dike, inundated the section of the city it was designed to protect, and carried away most of the embankment. A peculiarity of the flood here was that it reached a peak on a second rise on March 20, which happened nowhere else in the state. Walter P. Johns, city engineer, estimates that 30 per cent of the city's area was flooded. No trouble was experienced with water supply or power. Most of the area affected was high-class residential property. The flood reached a gage height of 33.1 ft., identical with the previous high water record of 1865. The river discharge is estimated at 300,000 sec.ft.. Loss will exceed $520,000 to city property alone, mostly in streets and parks.

Kingston, across the river from Wilkes-Barre was hard hit, some 3,200 homes and stores being affected. Robert Williams, city engineer, states that 27 miles of storm sewers and 27 miles of sanitary sewers are plugged or damaged. He estimates a cost of $800 a mile for cleaning the storm drains and $600 per mile for repairs to sanitary lines. A WPA project is being worked up to take care of the sewers. Kingston lost about 2 miles of low-type surface streets.

Sunbury—This city of 15,600 population just below the junction of West and North Branches of the Susquehanna suffered next to Johnstown in amount of damage in proportion to size. Here the municipal government fell down, and flood relief and restoration were taken over by a committee of citizens, headed by C. H. Hunt, of the chamber of commerce, and George W. Rockwell, prominent local contractor. Damage is estimated at $4,000,000 with 80 per cent of the city's area inundated. The North Branch broke through a dike at the upper end of town and swept through the business and lower residential area. This area is a natural basin, lower than the river bank, and its only outlet had been clogged by deposits of trash over a period of years. It was not until April 5 that the last of the water was drained off. Press reports of epidemics in the town were in error, for the health conditions were excellent at all times. Actually, the number of contagious diseases the week of the flood was 20 per cent under the corresponding week of the previous year.

Pittsburgh—This industrial metropolis is about back to normal. A strange note was sounded here, for city engineer Henry Johnson did not wait for WPA and but let emergency contracts for repair of streets, sewers and water plants, and had restored these vital services in a few days. Two large brick sewers in Wood St. and in Fifth Ave., built in 1867, have collapsed for short distances. The one in Fifth Ave. is being repaired by contract, but the city council is holding up work on the Wood St. sewer pending possible WPA aid. Damaged streets in the Triangle area were repaired and repaved so fast by contractors that they were ready for traffic by the time this district was opened up for business.

The emergency contracts were let on the basis of labor cost, equipment rental and overhead. The John F. Casey Co., whose yard is alongside the Aspinwall pumping and filter plants, completed a $40,000 repair contract to these plants in 90 hours. The full story of the repair work and of the whole water situation will be told in another issue.

Wm. B. Shafer, superintendent of streets and sewers, mobilized his entire array of graders, trucks, sweepers and flushers and cleaned the streets in short order. The WPA furnished considerable manpower for this work, in addition to cleaning out basements and yards. The department of streets hauled water in tanks during the water shortage.

Wheeling—Up to April 9 this city was about two-thirds cleaned up. The WPA forces working here were far less in number than in corresponding cities in Pennsylvania. About 100 buildings had been condemned, and some 200 sheds had been torn down by relief forces. Considerable trouble is being experienced with clogged and broken sewers. One main sewer on Wheeling Island is now found to be entirely washed out for a considerable distance. Pending final cleanup, the city cannot determine the full extent of damage to streets, and consequently has delayed in filing WPA projects for rehabilitation. City officials estimate 250,000 cu.yd. of mud has been removed from streets and alleys.

* * *

Steel Framework Problems of the World's Largest Sign

AN ELECTRIC SIGN a block long and eight stories high is the latest addition to the spectacular displays that give Times Square, New York, its world-famous brilliance. Said to be the largest sign in the world, its 90-ton structural steel framework presented some special problems in design, particularly in connection with rigidity and anchorage requirements.

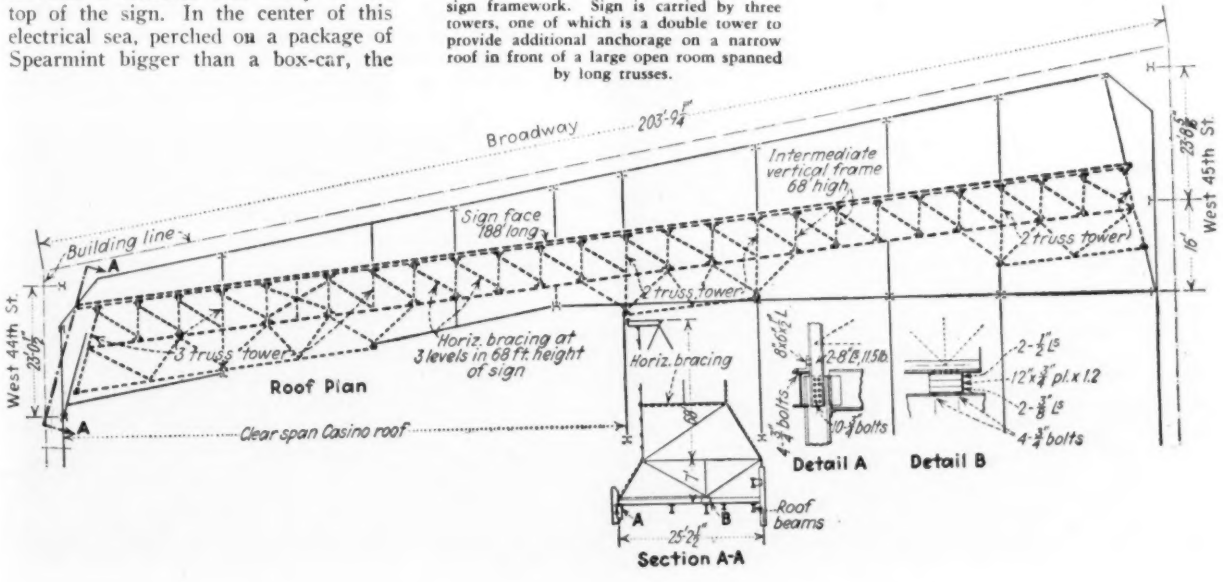
Resting on top of a new 2½ story building to be occupied by a theatre, night club and stores, the sign is said to provide more revenue to the building owners than would a tier of floors of equivalent height. On the sign face, according to the William Wrigley, Jr. Co., which has leased it, "Gigantic multi-colored fish, largest of which measures 42 ft. in length, appear to glide about among rhythmic waves of sea green light, in gentle, unhurried movement. Bubbles rise lazily to the top of the sign. In the center of this electrical sea, perched on a package of Spearmint bigger than a box-car, the traditional 'Spearman' dominates the scene. The Spearman's grin is a yard wide, and at that it isn't from ear to ear." The sign contains 1,084 ft. of gaseous electrical tubing and 29,508 electric light sockets. Eight tons of galvanized sheet metal are used to make the figures on the sign, and a control room hung from the framework contains 7½ tons of electrical equipment. The total weight of the sign is 110 tons. It is claimed that the electric current required for the display would serve all of the needs of a city of 10,000.

Anchorage problems

In view of the long clear spans in the restaurant portion of the building, it was deemed advisable to anchor the sign structure to the relatively narrow two-story section of the building that parallels the Broadway frontage and has an irregular width which at the narrow end is only about 20 ft. Considerable study was given to the problem, with the final decision not to support any part of the sign on the building roof trusses over the restaurant on account of possible vibrations being transmitted to the long span trusses with consequent damage to ornamental plaster ceilings.

The location of the main columns and girders of the building frame together with the required sight lines of the sign were the principal factors that determined the general character of the design of the superstructure. As finally developed, the design provides for the sign load to be transmitted to the building frame by three tower units. At the 45th St. end and also near the center of the sign where the tier-framed portion of the building is relatively wide, these towers are composed of two main transverse frames braced together but at the 44th St. or narrow end (Fig. 1) with the large open restaurant adjacent, the tower unit is made double with three transverse frames.

Fig. 1—Plan of supporting building and of sign framework. Sign is carried by three towers, one of which is a double tower to provide additional anchorage on a narrow roof in front of a large open room spanned by long trusses.



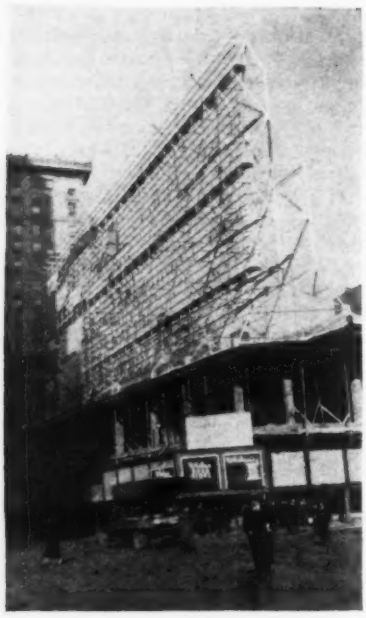


Fig. 2—Steel framework 75 ft. high and 188 ft. long for an electrical display sign in New York.

These main frames rest on the building columns and for additional stiffness and horizontal stability are connected to the roof girders by gusset plate connections (Fig. 1, detail B). One gusset connection is used for the narrow frames and two for the wider frames at the 45th St. end. These gusset connections are boxed and filled with pitch, to maintain the roof watertight.

An attempt was made to secure as much symmetry in the framework as possible. Thus all necessary variations in the framework are taken up in the tower bases which extend upward to the lower horizontal bracing truss. The sign structure above this bracing truss, except for the three-tower unit, is designed symmetrically throughout. This symmetry includes the secondary or intermediate vertical frames which are spaced 8 ft. apart, extending 68 ft. from the top of the sign to a point 7 ft. above the roof. Longitudinal vertical truss bracing on front and rear, and horizontal bracing at three levels about 25 ft. apart, carry the dead and wind loads to the seven main frames, grouped and braced to comprise the three tower units. To these intermediate frames, horizontal face angles spaced 2½ ft. on centers vertically are attached as supports for the sign display.

Supplementary structural features include cantilever brackets with a continuous rail at the top of the sign for hanging scaffolds; catwalks with handrail at three different levels; three iron ladders 75 ft. high; and the control room. This room, about 12x23 ft. in plan and 9 ft. high, is suspended in one of the towers. Its roof and walls are covered with corrugated steel sheets on steel studs and purlins, and the floor consists of heavy gage steel plates on I-beams. The room is lined with light steel plate and insulated with rock wool. Ventilation is secured by a revolving roof ventilator and two metal louvres in the end walls. The control house is entirely independent and clear of the building.

Because of the relatively large wind forces involved together with the open nature of the interior of the building, it was deemed imperative that the wind forces be transmitted directly to the main lines of steel building framing. The sign framework was designed to resist a wind pressure of 30 lb. per sq.ft. blowing from any direction on 35 per cent of the gross area of the face. No more than this amount of face is permitted to be covered solid.

The contract for the work, signed on Dec. 23, 1935, required that the builder secure $500,000 insurance against accident and set Feb. 19, 1936 as the date when structural work must be completed. This provided only 38 working days for the preparation of shop details, fabrication and erection. Holes for connecting to the building steel were drilled in the field while shop work was in progress. Erection was handled rapidly by means of a steel derrick with 110 ft. mast and 90 ft. boom which was set on the roof of the building. J. Di Stasio & Co. were the engineers for the General Outdoor Advertising Co., Inc., owner of the sign. Dunnigan & Dusenbury were the architects. The sign was fabricated and erected by the Peerless Iron Works.

Designing Concrete Girder Bridges for Continuity

In its Kankakee River Bridge, Illinois applies a variation of moment distribution procedure to the curved soffit girders and spreads the tensile steel at the piers out into the slab

By Alfred Benesch and Charles E. Morgan
Assistant Bridge Engineer and Design Engineer, Bureau of Bridges, Illinois Division of Highways, Springfield, Ill.

THE FIRST continuous concrete girder bridge to be designed and constructed by the Illinois division of highways crosses the Kankakee River on a bypass around Joliet about 50 miles southwest of Chicago, near Wilmington. Completed last December, the bridge consists of three continuous units of four 83-ft. spans; it has an overall length of 1,000 ft., a 44-ft. roadway and two 5-ft. sidewalks. The design and method of stress analysis used on this bridge will be used on all future bridges of this type by the Illinois division of highways. This design procedure involves a set of simple formulas derived in terms of moment-distribution constants. A feature of the design is the spreading of the girder tensile reinforcement into the slab at the pier locations, to reduce slab cracks and insure continuity. An integral concrete wearing surface is also used and appears to be satisfactory.

The continuous type of bridge was adopted for the Kankakee River crossing since the streambed is rock, the river is wide and shallow and because both beauty and economy are obtained coincidently in this type of construction. Although the most economical relationship of spans in a four-span group is to have the two end spans equal and the two middle spans each about 1.3 times as long as the end spans, this arrangement detracts from appearance, and all of the Kankakee River Bridge spans therefore were made of the same length. Also for appearance the parabolic intrados was carried all the way across the end spans of the continuous units.

Studies indicated the most economical depth for the girders to be about 7 ft. at the piers and 3 ft. at the centers of the spans, but on account of clearance requirements above high water these dimensions were made 5 ft. 7½ in. and 2 ft. 10½ in., respectively. This required the girders to be made 30 in. wide as compared with the 24 in. which would have been permissible if the greater depth of girder could have been used. A 9-in. slab was used to provide sufficient compression area in the T-beam; 6½ in. would have been adequate depth for a slab spanning between the girders.

The bridge was designed for H-15 live loading. Both maximum positive and maximum negative moments were obtained by loading two or more spans simultaneously with a uniform live load and a concentrated load in each span. Although the loading necessary to produce maximum moments is highly improbable, no reductions in moments were made on this account. Allowable stress for concrete in compression was 1,200 lb. per sq.in. An 18,000-lb. unit stress was used for the reinforcing steel. Concrete used in the superstructure was designed to have a strength of 3,500 lb. per sq.in. in fourteen days and a modulus of rupture of 650 lb. The 28-day cylinder tests showed strengths of about 5,000 lb. per sq.in.

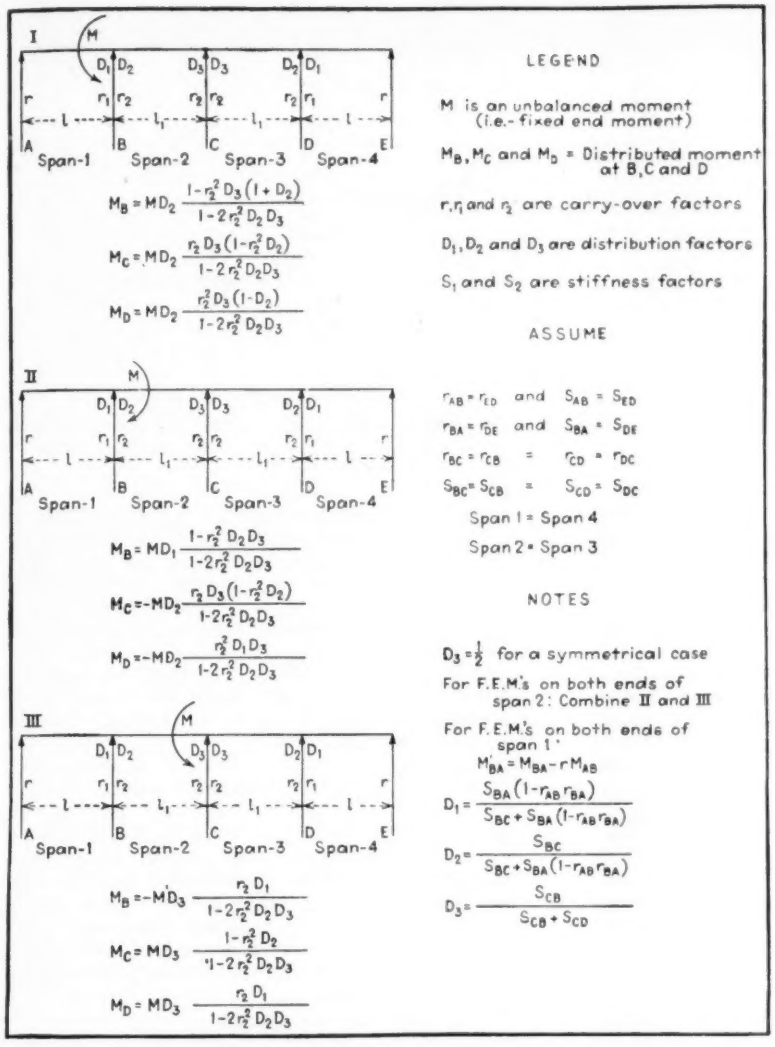

I
II
III
Span-1
Span-2
Span-3
Span-4
LEGEND
M is an unbalanced moment (i.e.- fixed end moment)
MB, MC and MD = Distributed moment at B, C and D
r, r1 and r2 are carry-over factors
D1, D2 and D3 are distribution factors
S1 and S2 are stiffness factors
ASSUME
rAB = rED and SAB = SED
rBA = rDE and SBA = SDE
rBC = rCB = rCD = rDC
SBC = SCB = SCD = SDC
Span 1 = Span 4
Span 2 = Span 3
NOTES
D3 = 1/2 for a symmetrical case
For F.E.M.'s on both ends of span 2: Combine II and III
For F.E.M.'s on both ends of span 1:
M'BA = MBA - rMAB

FIG. 1—DESIGN FORMULAS for distributing moments in a four-span symmetrical beam as developed by the Illinois division of highways.

In many structures of this type the roadway slab between the girders over the piers has cracked transversely because of high tensile stresses. It was felt that this fact should not be ignored, particularly since all Illinois highway slab designs are made on the basis of the Westergaard formulas (*Public Roads*, March, 1930) which assume no discontinuity of the slab. Moreover, cracks in the tops of slabs subject them to deterioriation.

Since the tensile stress in the slab is practically constant in value across the roadway over the piers, the main tensile steel at these points was distributed in the slab and in the tops of the girders in proportion to the theoretical total stresses, based on the assumption of no failure of concrete in tension. The bridge was built with about 75 per cent as much main steel in the slab proper as distribution by this method would require. After the forms had been removed from the first unit and three weeks after it had been poured, the contractor was allowed to drive his material trucks over it to reach the unit under construction. Although these trucks were as heavy as those assumed in the design, no cracks in the slabs could be detected.

Design methods and formulas

Because of the economy of this type of bridge over simple span concrete girders, its continued use is anticipated, and a method of design was established involving simple formulas and curves from which influence lines can easily be drawn. The formulas were derived in terms of the moment distribution constants of Prof. Hardy Cross and were determined analytically by the method of summation of moment areas (see Large's discussion of Professor Cross' paper in *Transactions*, Am.Soc.C.E., Vol. 96, p. 101).

The relationships between the constants—carry-over factors, distribution factors, stiffness coefficients and fixed-end moments—determined by the above method were compared with the corresponding constants taken from curves previously prepared for rigid-frame bridges with parabolic intrados. The values checked within 2 per cent if the m value was taken equal to

$$\sqrt[3]{\frac{I\,(\text{support})}{I\,(\text{crown})}} - 1$$

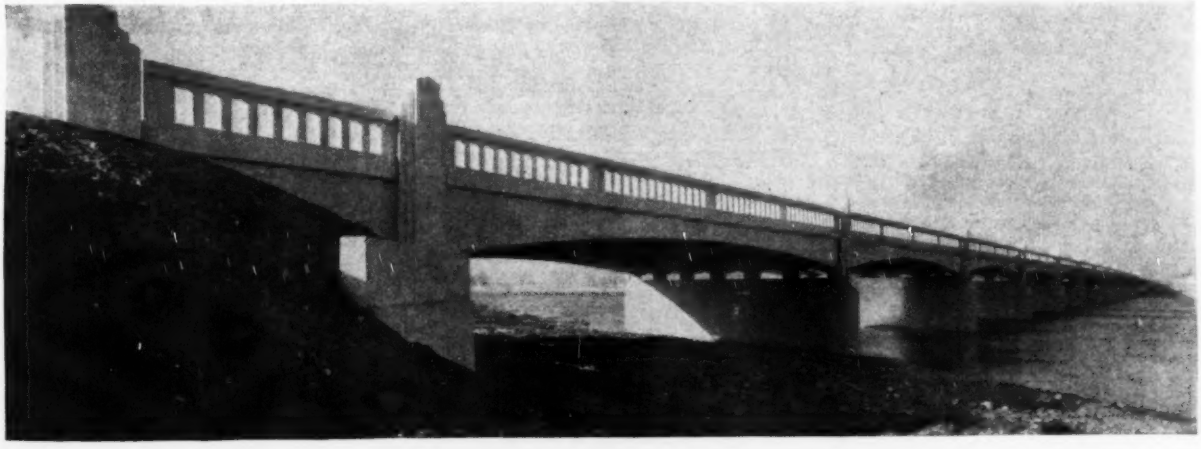


FIG. 2—CONTINUOUS concrete girder bridge over the Kankakee River in Illinois. Three groups of four 83-ft. spans make up the 1,000-ft. length.

of the girder section, including the slab. The factor m is the ratio of the increase in depth of the rigid-frame slab at the support to the depth at the crown—that is, the rise equals md where d is the depth at the crown.

Subsequent structures of this type are being designed by finding the m value by the relationship above and then obtaining the Cross constants from the curves prepared for the parabolic slab-deck rigid frames. After obtaining the Cross constants and the fixed-end moments for the various positions of the loads, final distributed moments are obtained directly by the formulas given in Fig. 1.

These formulas for final distributed moments are general and are applicable to any continuous units regardless of the variation of the moment of inertia, if the members are symmetrical about the center line of the unit. In Fig. 3 are given similar formulas for a three-span layout, which is probably more often used than a four-span layout.

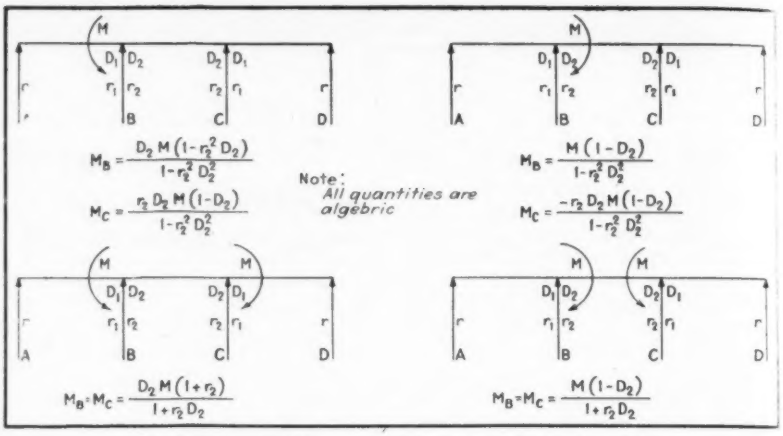

M
D1 D2 D2 D1
r r1 r2 r2 r1 r
A B C D
$M_B = \frac{D_2 M(1-r_2^2 D_2)}{1-r_2^2 D_2^2}$
$M_C = \frac{r_2 D_2 M(1-D_2)}{1-r_2^2 D_2^2}$
Note: All quantities are algebric
$M_B = \frac{M(1-D_2)}{1-r_2^2 D_2^2}$
$M_C = \frac{-r_2 D_2 M(1-D_2)}{1-r_2^2 D_2^2}$
$M_B = M_C = \frac{D_2 M(1+r_2)}{1+r_2 D_2}$
$M_B = M_C = \frac{M(1-D_2)}{1+r_2 D_2}$

FIG. 3—THREE-SPAN symmetrical beam formulas for determining distributed moments.

Girder deflection camber

A dead-load deflection curve was made for a continuous unit of four spans, using M/EI as a loading in which M is the dead-load moment at any point, E is 3,000,000 lb. per sq.in., and I the moment of inertia of the girder and slab at points corresponding to M. Camber was placed in the girders corresponding to this calculated deflection.

Careful readings taken along the curbs showed that at the end of three months the deflection had just equalled the camber provided. Slight additional deflection is expected up to six months or until plastic flow ceases. In order to provide against ultimate deflections greater than the above camber, subsequent bridges of this type will be figured on the basis of a modulus of elasticity of the concrete, $E = 2{,}500{,}000$ lb.

Because of the uncertain extent to which separate wearing surfaces participate in the stresses in continuous decks, the wearing surface of the Kankakee River Bridge was made integral with the slab. This finish has proved satisfactory and as a whole is as good as has been obtained on many bridges with separate wearing surfaces. The use of a separate wearing surface, it has been concluded, is not worth the additional cost, and its use will be abandoned on future bridges.

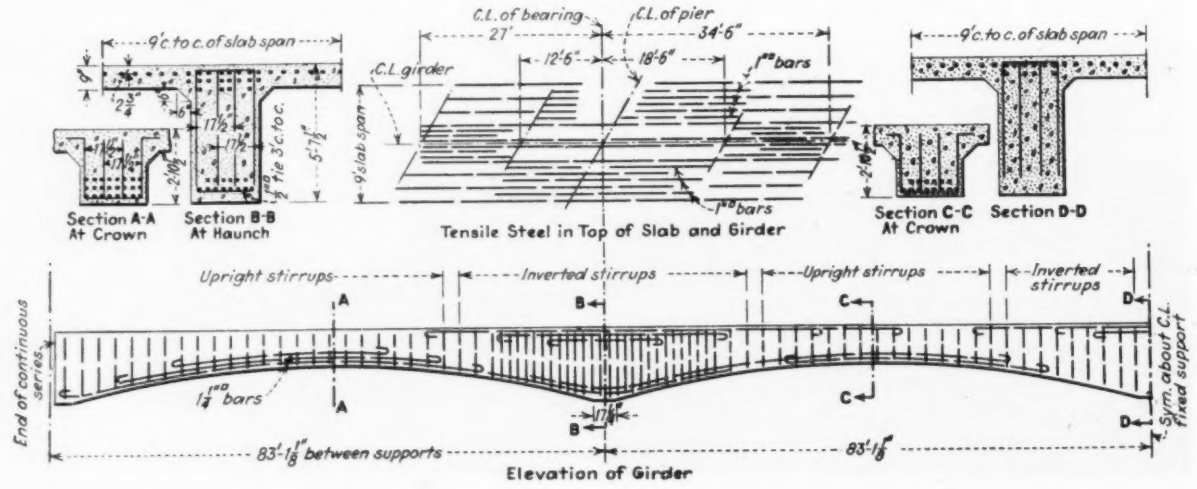
Continuous concrete pours

The contract called for the girders and the slabs of one unit to be poured in a continuous operation within 48 hours. Because the contractor did not have complete control over his labor supply, this stipulation made it difficult to secure a first-class job. It appears that if the centering for the deck forms be made adjustable and if care be taken to keep the forms at the proper elevations at all times, pouring could be discontinuous at any of the many points of contraflexure. However, in this case more than ordinary care would need to be taken in bonding the new concrete to the old. Another way to eliminate such large continuous pours would be to place a construction joint between twin girders along the center line of the roadway and build one-half of the bridge at a time; this method is now being used by the Illinois division of highways.

Administration

The Kankakee River Bridge was built in four months at a cost of $189,000. Selection of type, determination of major details and the development of methods of stress analysis were made by the authors with the approval of Ernst Lieberman, chief highway engineer. P. R. Patterson was in immediate charge of design computations and preparation of plans. Raymond G. Johnson is architect for the bureau of bridges; R. Renick was resident engineer. E. J. Albrecht Co., Chicago, was the contractor.

FIG. 4—TENSILE STEEL over piers in Kankakee River bridge is divided between girders and slab according to the theoretical stresses in each. Spreading the steel into the slab eliminates cracks and insures slab continuity.



Letters to the Editor

The Title "Ingeniero" in Mexico Is a Mark of Distinction

Sir—Public recognition for the engineering profession through the use of the title engineer, or its abbreviation, as a distinctive designation was commented on in your editorial columns Jan. 2, p. 25, and a reply from Engineer D. B. Steinman, president of the National Society of Professional Engineers, was published in your issue of Feb. 13, p. 256. It occurred to me that it might be interesting in this connection to give my impression of how this seemed to work in Mexico, during my period of service as an engineer on the Inter-American highway from Laredo to Mexico City.

The Mexican engineer is a titled individual. Likewise are various high officials titled: "Senor Secretario," "Senor Presidente," or if one would further compliment the mayor of his town, he says, "Mi Presidente." Lawyers are titled "Licenciado," which is interpreted, "Counselor."

The Mexican engineer upon graduation from college is not a titled man, he must perform some work or accomplish some creditable achievement in an engineering field and report his labors in thesis form to the National University for Engineers in Mexico City. If this thesis is found acceptable, the man is titled "Ingeniero" and his secretary may type "Ing." before his name.

No experienced observer doubts but that a title of note does carry a certain amount of dignity. That dignity enables the titled engineer of Mexico to organize and manage his work with a minimum of quibbling and bickering, and it establishes him in an appropriate position in the society of his fellow men. By reason of increasing his net effectiveness, his title directly has beneficial bearing upon his remuneration.

It is a fact and a matter of wide attention that young Mexican engineers rapidly acquire a graceful dignity in the conduct of their work and that they handle positions of responsibility creditably and at early ages. I attribute this in a large measure to the fact that they are titled and respected men.

It is unfortunate that engineers in the States have not the opportunity to function in an environment wherein they are respected as professional equals of physicians, military men, and responsible public officials.

The president of the National Society of Professional Engineers in his letter of Feb. 13 has espoused a cause which should improve our profession a great deal.

This society should actively further its proposal. Inasmuch as the action of the society stands for the betterment of the engineering profession, it deserves the support and commendation of all engineers, and it has mine.

ING. ROBERT B. BROOKS, JR.
Formerly associated with the Direccion Nacional de Caminos Mexico, D. F.

Title "Engineer" Opposed as a Prefatory Designation

Sir—D. B. Steinman contends that the engineering profession lacks a "distinguishing designation" and argues (*ENR*, Feb. 13, p. 256) that we should demonstrate our professional pride by adopting a "professional appellation." We have both, I think, in our present use of the word "engineer" and in the abbreviations which indicate academic training for practice of one of the branches of professional engineering. I cannot see that the value of our professional appellation is increased by converting the generic noun into a "prefatory designation." Nor have I discovered in all the examples and precedents he has cited a single case of a *professional appellation* which is at the same time an *exclusive prefatory designation* of any one profession.

Professor and Dean, Colonel and General, cited as prefatory designations, are not professional appellations covering an entire group; they denote rank within, not a vocation. Certainly "Doctor" or "Dr." cannot be called a "professional appellation." It is not the exclusive property of any vocation or profession. It is the "distinguishing designation" of all men whose academic achievements have won for them this title. I have never encountered in the medical profession the proprietary attitude toward the title which Engineer Steinman seems to discover in their license laws. The medical profession makes war upon those whose unauthorized assumption of the title doctor is coupled with intent to deceive the public. The universal practice of addressing physicians as "doctor" is based on correspondingly universal academic attainments.

We engineers have never been able to keep the squatters off our claim to exclusive right to the title engineer. Changing it from a suffix to a prefix cannot be expected to educate the public in discriminating use of the word. The line of demarcation which Engineer Steinman considers so clear cut by license laws does not seem to me as effective as he believes it to be. Among the 35 laws restricting the title are two which are merely permissive; one which applies only to structural engineers; three that cover only civil engineers; two more that exempt mining engineers. In view of his statement that regardless of educational degrees or professional achievements no one is an engineer unless he is registered, I wonder how these exempted mining, electrical and mechanical engineers will designate themselves. Practically every state law I observe exempts from registration men who serve as assistants to registered engineers; interstate corporation employees, engineers in employ of the Federal government are also exempt in many laws. What will these men call themselves if not engineers?

In a survey of registration laws published by the American Association of Engineers I find basis for my belief that they will without registration continue to use the only title which aptly indicates their training and activities—engineer. I base my conclusion on a table which compares the census enumeration of professional engineers in each of the states with the number reported by the state as registered. The ratio is about 20 per cent. The 80 per cent, most of whom are exempt, continue to use the title regardless of statutory restrictions. The only court decisions that I have found reported in which individuals were prosecuted for illegal use of the title concerned men who advertised themselves as able and willing to perform services of a character legally restricted to registered engineers, that is, to assume responsible charge. I shall be interested in any case which may arise involving the right of an exemptee, legally engaged in engineering without registration, to call himself an engineer. I do not believe it will be considered at all significant whether he used the word as a suffix or a prefix.

Engineer Steinman thinks that a prefatory designation will make people generally appreciate engineering as a learned profession. I think they do. I think they have a pretty fair idea of the relative severity of educational requirements in medical and engineering licensure. Every physician must have a degree of doctor of medicine to be licensed. There is not a state in the Union that demands as much of its engineers. In only one state is there an absolute educational requirement; in the others, experience satisfactory to the examiners may substitute for formal training. "Engineer" as a prefatory appellation will not automatically raise the profession in public regard until it signifies high educational qualifications. Technological progress in this country proves that there is an aggregate of ability in the profession, but it does not prove that it is characteristic of all the members. An improvised title will not have much effect outside the profession but it may appeal to the rank and file as a democratic gesture. It seems to me a practice that will have its highest usefulness in convention halls.

W. R. HARRIS.
Madison, Wisconsin.
April 1, 1936.

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April 23, 1936

Disposal Progress

CONSISTENT progress is apparent in refuse disposal practice; completion of the Columbus incinerator is further evidence of this progress, and expresses characteristically the trend of the day. Following on the erratic and conflicting movements of practice in the decades just before and just after the turn of the century, when cities resorted variously to garbage reduction, hog feeding, incineration and land disposal—often nothing more than dumping—the trend of the last decade or so has been steadily toward incineration. In the background of the change lie many technical and commercial difficulties revealed by practical experience with the different methods, but quite as important as this is the evolution of scientific method in the planning and operation of incinerators. No continuous progress was possible while operation remained so imperfect or variable that the reek from an incinerator would pollute the atmosphere for miles around and incinerators were objects of general opposition even when placed in remote locations. How this condition was progressively improved will be outlined by an instructive review of change in incinerator practice that is to appear in *Engineering News-Record* within a few weeks. The increasing number of well-planned and well-managed plants among American cities means that refuse disposal and its associated problems of collection and sorting are now receiving adequate technical study and are approaching the high plane occupied by water supply and sewage disposal.

A Century's Record

AMERICAN contracting firms are notoriously short-lived. The usual career of a contractor is a slow rise from a small beginning to a few short years of prominence, followed by a rapid decline into oblivion, all within one generation. The older firms were often dominated by one outstanding character, whose death ended the company's career; many of the newer firms have been lost in reorganizations and mergers. The untimely death of Silas B. Mason, however, calls attention to an exception to the normal course, for he was head of a company that has made construction history in this country continuously for more than a hundred years. In 1819 his grandfather, Claibourne R. Mason, undertook his first contract, using a truly one-man organization, equipped with mule, scraper, pick and shovel; this was the start of a construction business that later built the railroad empire of the Virginias, Kentucky and other parts of the South, that acted as construction force for the Confederate army, and rebuilt the railroads demolished during the Civil War. The century's record constitutes a distinguished chapter in the annals of engineering construction in the United States. Successors to the first Mason were eventually to perform bold and unusual construction tasks, on the Chicago Drainage Canal, New York subways, East River tunnels, the deep open cofferdam sinking of the George Washington bridge, and the belt-conveyor-driven Boston vehicular tunnel. Today the firm is in the public eye because of gigantic contracts for Grand Coulee dam and the Midtown tunnel at New York. For sustained performance as for longevity its record is unique.

Save the Remnants!

TO ALL APPEARANCES abandoned by both Congress and President, the Florida canal and the Quoddy power plant offer a nice problem in salvaging. Compared with the estimated total cost of nearly $200,000,000, the $5,400,000 appropriated for the canal and the $7,000,000 appropriated for the tidal power plant do not count large; yet $12,400,000 is a considerable sum of any man's money. Can part of it be retrieved? Candidly, there seems small hope of return from the sums already paid out; so much of it as is represented by tangible property is an investment that cannot be realized on, because it is not now wanted where it is and it is mostly in property having little removal value. On the other hand the cash not yet spent can be salvaged. It is true that on the canal most of it is committed by contracts, which must first be abrogated—with a fine chance of court battles by contractors for damages and anticipated profits. Yet if the enterprises are to be discarded the remaining money ought not be wasted. Estimates of the unexpended cash in hand are uncertain, but perhaps $2,000,000 is reasonable. Undoubtedly every business man would try to save such a fund; the nation should be no less careful of its money. We should not continue to heat an abandoned house because there is still a ton of coal in the cellar.

Jobs at Low Cost

FIGURES recently compiled by the Public Works Administration from records covering more than a billion dollars of construction work on its projects bring out the interesting and important fact that it created a man-year of employment for every $742 of federal funds contributed out of the $3,300,000,000 of the 1933 recovery fund. Comparable data for the operation under the 1935 program are not yet available, but it is fair to assume that their showing would not be materially different after allowing for the larger percentage of grant money. The figure strongly supports every claim that was made for a national program of normal construction of needed improvement projects ever since the public-works plan of breaking the depression was first proposed, five years ago. The early arguments all were founded on the claim that every $1,000 would create a man-year or more of employment—and the figures show that this claim was actually bettered by more than one-third. No other stimulant of recovery and no other remedy for unemployment has been able to show a higher efficiency—neither breadline relief nor WPA system. The public-works figure cited is that of the federal contribution alone, of course, and was actually supplemented by other funds more than twice as large in amount. But these other funds, which in part came initially from PWA loans, later transformed into private investment loans at a substantial profit, added to the recovery effect by reanimating public-works finance and restoring the habit of investment. The steady rise in construction activity during the last two years reflects the influence of stimulation of industry and business and speaks strongly for what might have been accomplished by an energetic, well-planned public-works program taken in hand when the catastrophe of unemployment was first making its

destructive effect felt. It is an indication also of the beneficent effect on the country's welfare that might have been realized through the $4 billion appropriation of 1935 had this sum, too, been turned into channels of constructive works through the country's established professions and agencies of construction.

A Job for the Future

THE PASSAMAQUODDY tidal power project hangs in the balance. Unless Congress formally approves it and provides money for its continuation the project will be abandoned and the six million dollars or more already spent must be charged off to unemployment relief. This is the substance of the President's statement of last week concerning Quoddy and the Florida Canal. Though nearly a year late as regards Quoddy, the President's decision to let Congress weigh the pros and cons of the great tidal power scheme before committing the country to the large expenditure involved is welcome, for if the project has no justification in service value it is better to stop at once.

Only in one respect has the delay in putting the project up to Congress been advantageous; Congress now will have the benefit of ten months of intensive study of the project by the army engineers. A year ago no one knew whether the plan then proposed was the best or was reasonably feasible, nor did anyone know what it would cost. Now the army engineers know a great deal about the practicability of the project that was handed to them last May, and they know that despite their best efforts to keep down the cost it will cost much more than the original estimate of $36,000,000. How much more they will not say until Congress asks for a formal opinion, as possible modifications are continually being considered.

The most significant modification that has been made is abandonment of the pumped-storage auxiliary power plant because the site selected for the storage reservoir was found to be impracticable and no other suitable site has been found. In place of the auxiliary pumped-storage plant it is proposed to substitute a diesel or steam-driven plant to fill in the gaps in the power curve when the tidal plant cannot be operated. At first glance this might appear to be a logical proposal, but on more careful study it becomes apparent that the auxiliary plant must have sufficient generating equipment to maintain the primary output of the tidal plant, that it must be run alternately for about 5½ hr. twice each day and shut down for 7 hours, a very inefficient method of operation. And all to what end: to save the fuel that would be required to run the plant in the 7-hr. runs of the tidal power plant. Against this saving must be set the total capital cost of the tidal power plant, its dams, filling gates and locks as well as the cost of their operation.

In the background lies the fact that even the relatively small output of the proposed plant—264,000,000 kw.-hr.—is not needed at the extreme eastern tip of the United States, and that the only way to attract industries to a point so far from their potential markets is to offer very cheap power. At best the power that could be generated in the present project will be far from cheap.

This much should be said in defense of those who have persisted in efforts to build a tidal power development in the waters around Passamaquoddy Bay: They started out with a scheme that had good prospects of providing cheap power. Its trouble was that there was no market for the vast amount of power that had to be produced to bring the unit cost down to a low figure. Also difficult international questions were involved. Their error lies in having let their enthusiasm for the basic idea obscure the fact that when confined to the smaller bays within the state of Maine the cost of dams and other necessary elements does not decline nearly as rapidly as does the possible power output.

It is to be hoped that Congress will ask the army engineers to speak their minds freely and that fear of appearing to criticize the Administration will not deter them from speaking frankly. If they do there is little question as to the fate of the present undertaking. At some distant date, when power needs have grown far beyond present proportions, Canada and the United States may unite in undertaking the much larger international scheme.

Complicating The Problem

WITH A ZEAL worthy of a better cause the Binghamton *Press* in its issue of April 13 assails some of our recent statements on flood-control difficulties. The editor's apparent purpose is to win support for federal flood-control appropriations without regard to local responsibilities. In pursuing this purpose the paper helps to complicate the flood-control problem and to mislead its public. It opposes our suggestion that "Congress will do a truly constructive thing if it initiates full studies and surveys and lays down a policy for national and local cooperation that can be applied anywhere in the country and will be fair to all interests concerned." Evidently the *Press* fears that any well-considered policy might stand in the way of Binghamton's dumping its primary responsibility to protect its lowlands and its river-plain encroachments into Uncle Sam's lap.

The simple fact is that it has long since been in the power of Binghamton and its sister communities along the upper Susquehanna to organize for flood control and carry out a properly studied system of protective works, precisely as was done by Dayton, Middletown, Hamilton and the rest of the Miami valley twenty years ago. Did the organs of public opinion along the upper Susquehanna exert themselves to bring about such action? It would have been proper public service had they urged long ago that the valley's flood problem be given thorough study.

Speaking of another city, in a situation not unlike that of Binghamton, an engineer of large flood-control experience says in a letter just received, "It is typical of a community waiting with its hands out for Uncle Sam to do everything in a matter in which the local community should play a substantial part." To correct and reverse such attitudes on the part of the uninformed public is one of the great public services that newspapers can render in these days of flood havoc and flood-control discussion. They can help to build up clearer understanding of the difficulties of flood prediction, the possibilities of protective works, and their relation to national, state and local interests. With such understanding the prodigious task of making progress in our neglected flood protection problem would be greatly simplified—especially at this time, when reduction of national expenditure is one of the major issues before the American citizen.

CURRENT NEWS

Willacy County Case Gets Under Way

District Supreme Court begins trial of seven indicted on charges of conspiring to defraud the government

TRIAL of the seven defendants on charges of conspiring to defraud the government on a PWA irrigation project in Willacy County, Tex., was begun in the District of Columbia Supreme Court on April 21. Maj. Charles R. Olberg, formerly engineer examiner for the Public Works Administration, and Perry A. Welty, also a former PWA engineer examiner, were named, with five others in an indictment returned in March, 1935, by a special grand jury (*ENR*, March 28, 1935, p. 464). Others named in the indictment are William A. Harding, Raymondville, Tex., a director of the Willacy County Water District; Leonard C. Hammond, vice-president, Hammond Lumber Co., San Francisco; Harry W. Cole, vice-president, Hammond & Little River Redwood Co.; James P. Barry, engineer, Hammond & Little River Redwood Co., and Frank P. McElwrath, contractor and banker, Corsicana, Tex.

The object of the conspiracy, as alleged by the indictment, was to bring about the rejection by PWA of the plans submitted by the Willacy County Water District for construction of the project by means of a gravity and open canal system, and to then obtain approval for a pipe pressure system according to specifications that would confine bidding for all practical purposes to those who were to use redwood pipe.

A demurrer was later filed by the defendants and sustained by the court, after which the government appealed to the Court of Appeals of the District of Columbia. The case was remanded to the District of Columbia Supreme Court on Jan. 6, 1936 (*ENR*, Jan. 9, 1936).

To Study Super Highway For Chicago West Side

A board of seven engineers made up of heads of city and county departments has been appointed in Chicago to investigate proposals for the development of an arterial traffic entrance into the heart of the city from the West Side. Advantages and disadvantages of various routes and types of street improvement, such as widening, depression and elevation are to be covered by comparing costs, benefits and utility. For years the West Side has been asking for traffic improvements commensurate with the traffic facilities provided for the North Side and South Side, along the lake front. Several proposals and various routings have been worked out but no one project has ever been able to muster sufficient support to carry it even to the financing stage.

Mayor E. J. Kelly has ordered the present investigation and Oscar E. Hewitt, commissioner of public works, has named this technical board so that a definite project covering route and design can be recommended for future allocation of funds when available.

The personnel of the board is as follows: Loran D. Gayton, acting city engineer; Hugh E. Young, chief engineer, Chicago Plan Commission; Leslie Sorensen, city traffic engineer; A. J. Shafmayer, engineer, Board of Local Improvements; James J. Versluis, engineer, waterworks construction; William R. Mathews, assistant engineer in charge, Bureau of Sewers, and George A. Quinlan, superintendent of highways, Cook County.

Housing Act Amendments Allow New Construction

To aid in the work of flood rehabilitation, special amendments to the National Housing Act, as finally approved, not only permit repair and modernization of structures and equipment but also new construction, new equipment and machinery. New construction may be on the same site occupied by the original structure or on another in the same locality. Lending institutions are insured against loss up to 10 per cent of all loans made and may resort if necessary to insurance reserves accumulated on modernization loans prior to April 1. This protection applies to loans up to $2,000 on residential and farm property and $50,000 for industrial, commercial and institutional property. The special amendments will continue in effect until Jan. 1, 1937, unless terminated by President Roosevelt at an earlier date upon a finding that the emergency no longer exists.

Cofferdam Work Begins At Chickamauga Site

Driving of sheet steel piling began, April 16, on the first cofferdam at Chickamauga Dam, TVA's construction project on the Tennessee River near Chattanooga, Tenn.

The cofferdam will consist of 38 individual cells and two shore connections, all of steel piling. These units will be linked together by arcs of steel piling. Each cell will be 47½ ft. in diam. The structure will extend outward 350 ft. from the north bank of the river and surround a construction area 1,400 ft. long.

About 4,375 tons of 15-in. wide interlocking piling, measuring from 30 to 60 ft. in length, will go into the cofferdam. The entire structure will be filled with sand and gravel by a hydraulic dredge operating within the area to be enclosed.

Present plans call for the construction of a single-lift navigation lock within the area set off by the cofferdam. The lock will have a maximum lift of 48 ft. The chamber will be 360 ft. long and 60 ft. between walls. Excavation for this structure will necessitate the displacement of 97,800 yd. of earth and 16,000 yd. of rock.

Illinois Section, AWWA, Meeting

Annual award for meritorious service in waterworks field decided upon by Illinois Section of AWWA

A LARGE number of practical papers on operation problems, a lively discussion on education and jobs, quality of water involving corrosion, filtration, softening and odor elimination, and well drilling experience characterized the two-day meeting, April 11-12, of the Illinois Section of the American Water Works Association at Evanston, attended by nearly 200 registrants.

Noting the improved efficiency in police departments and common carriers as the result of recognition of outstanding performances in safety and other fields, the section feels that special service in furnishing a sterile, adequate and potable supply of water should also be recognized. Consequently meritorious service on the part of water companies and water departments in Illinois will in the future be repaid by an annual award from the Section.

The educational problem

Growing out of a paper, on the educational situation in waterworks engineering by Prof. H. E. Babbitt, and the discussion following its presentation, the officers of the section and parent organization were requested to consider doing something to effect better coordination between educators, the prospective personnel the educators are training and the employers in the waterworks field who, it is hoped, will take up these specially trained men. At present, Professor Babbitt brought out, the schools find placement of the men they train difficult. In consequence fewer men are trained until the output is far below the death losses in the waterworks field. Other industries have started again to send their personnel heads to the schools to recruit the most likely graduates. Waterworks officials have never done this and placement of trained men is difficult.

Operation problems were covered in five papers relating to meters, records, cold weather difficulties, thawing pipes and the whole range of superintendents' problems from meter reading to finances.

LaVerne Trentlage, superintendent, Elgin meter department, described the revamping of a run-down department formerly housed in an old stable, meters indifferently read and billing irregular. An efficient card record system was installed, meter testing equipment put in, meter readers' routes worked out on an efficient basis and testing done at definite periods, depending on size. A novel method of cleaning and brightening meter parts was developed in cooperation with the General Chemical Co. Parts are dipped in hot trisodium phosphate, rinsed to remove the alkali, dipped in muriatic acid, rinsed, then immersed in a bright dip solution of nitric acid, sul-

phuric acid and common salt, rinsed in boiling water and finally dipped in a stabilizing solution. A bright, new looking meter has a good psychological effect on the consumer, said Mr. Trentlage.

C. M. Roos, vice-president, Cairo Water Co., in his paper on operating records made a plea for making records for use in day-to-day operation. For this purpose record forms are made up so that original entries are comparable, thus an unusual reading gives the staff immediate warning. Essential points in records which Mr. Roos enumerated were as follows: Simplicity, brevity, accuracy, availability, reasonable economy, adequacy and originality of entries.

Cold weather damages

The extremely cold weather effects on the Chicago waterworks system of the past winter were presented by Loran D. Gayton, city engineer. Fifty sections of mains were frozen. Hydrants gave no unusual trouble. Some 3,200 frozen meters were removed as against 897 in 1933, 424 in 1934 and 770 in 1935. Approximately 5,400 services were thawed at a cost of $101,000, utilizing six kinds of apparatus; portable gasoline-furnace fired boilers generating steam, portable steam boilers on skids, one on a truck, a steam roller, gasoline motor-driven electrical generators and two transformers of the Commonwealth Edison Co. Ultimately extra cold weather costs this year will run to $230,000.

Frank C. Amsbary, Jr., reviewed the literature on electrical thawing equipment and gave the results of a questionnaire on costs which ranged widely from $1.50 to $50 and $60 per service on main.

On quality of water were papers on corrosion, odor elimination, testing methods, softening at Fairbury, extension of the Evanston plant, subsurface washing of filters at Kenilworth by the Jewell method and a survey of pollution which waterworks in cities on Lake Michigan must handle.

Officers elected for the ensuing year are as follows: C. H. Spaulding, chairman; F. C. Amsbary, Jr., vice-chairman; Prof. H. E. Babbitt, section director; W. D. Gerber, Urbana, secretary-treasurer.

Buzzard's Roost Case Goes to Supreme Court

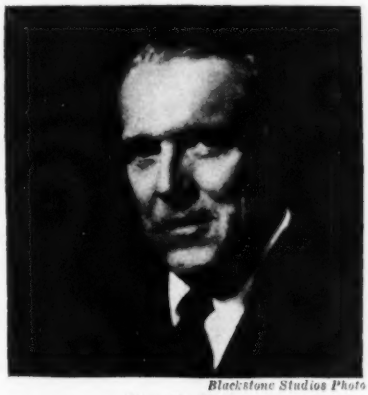
The Duke Power Co. on April 17 requested a Supreme Court review of the long-fought Buzzard's Roost case, in which it challenges the right of the federal government, through the PWA, to make a loan and grant of $2,850,000 to Greenwood County, S. C., for the construction of a publicly-owned power plant. The constitutionality of such use of PWA money was upheld by the U. S. Circuit Court of Appeals at Charlotte on Feb. 22.

The decision in this case is expected to set a precedent that will determine the validity of about 60 similar allotments for the construction of power plants in various parts of the country, all of which are now tied up by court proceedings. Total amount of federal loans and grants involved is about $200,000,000.

April 17 also marked the opening of arguments, in the District of Columbia Supreme Court, directed against PWA allotments for power purposes in ten cities in Alabama, Oklahoma, Texas and Vermont.

Silas B. Mason, Contractor, Dies at Grand Coulee Dam

Silas B. Mason, prominent contractor and head of the nation's oldest construction company, died April 14 at the Mason City, Wash., hospital after suffering a stroke in his field office at Grand Coulee Dam. Born in Orange County, Va., Oct. 1, 1879, he was 56 years old at the time of his death. He was chairman of the board of four construction companies: Mason & Hanger Co.,



Blackstone Studios Photo

Silas B. Mason

Inc., the Silas Mason Co., Mason & Walsh Co. and Mason-Walsh-Atkinson-Kier Co., the last holding the contract for Grand Coulee Dam. The Mason & Hanger Co., founded by his grandfather, Claibourne R. Mason in 1819, is believed to be the country's oldest construction firm.

After attending Princeton University and the University of Virginia Mr. Mason spent a year with the Newport News Shipbuilding Co. and then joined his father's construction firm, the Mason & Hoge Co., of Frankfort, Ky., in 1902. In 1907 this firm became the Mason & Hanger Co., and Mr. Mason became its president in 1926 upon the death of Harry B. Hanger. Late in 1926 he organized the Silas Mason Co. for the purpose of building a section of the New York subway, other sections of which were being built by the Mason & Hanger Co.

For more than a century the Mason firms have been prominent in construction circles. The original Mason Syndicate built many of the railroads in the South both prior to and following the Civil War. During the war the syndicate acted as construction force for the Confederate Army, and later rebuilt many of the railroads destroyed in the conflict. Successor companies built six of the 31 sections of the Chicago drainage canal. During the World War, Mason interests built the Old Hickory explosives plant, Camp Taylor, at Louisville, Ky., and port terminals at Port Newark, N. J., and Charleston, S. C. Silas B. Mason was in personal charge at Old Hickory. The company also built a section of the New York aqueduct.

During later years the Mason companies have been noted for several outstanding contributions to the art of construction. For the Fulton St. East River tunnels a rotating cradle was devised that greatly simplified shield erection. In sinking the west pier for the George Washington bridge at New York an open cofferdam was carried down to the unprecedented depth of 79 ft.; all other contractors planned on using a pneumatic caisson. In driving the Boston vehicular tunnel an ingenious arrangement was developed to permit belt conveyor operation through the air locks. At the Midtown Hudson tunnel, now under way in New York, a hydraulic wrench was devised for rapid tightening of the lining bolts, resulting in phenomenal speed in driving the tunnel.

The Mason & Walsh Co. was organized in 1934 for the driving of the Fort Peck dam diversion tunnels. The contract was terminated about three months ago by agreement with the government when the design of tunnels was changed. The Mason-Walsh-Atkinson-Kier Co. was formed for the purpose of building Grand Coulee Dam.

Funeral services for Mr. Mason were held April 19 at his farm home near Lexington, Ky.

Intestinal Epidemic Origin Under Study at Milwaukee

Orders to boil all water were issued at Milwaukee as one of the efforts to curtail a gastro-intestinal malady that affected more than 120,000 persons during the latter part of March and the early part of April. The cause of the epidemic is under investigation by health and water officials of state and city, but no conclusion has yet been reached as to the probable transmitting agent involved. The ailment, which is highly contagious, is believed to be a virus transmitted by air or direct contact, according to Dr. J. P. Koehler, city health commissioner.

One theory suggests that the recent dust storms may be involved in spreading the disease. The city water supply has also been closely scrutinized because strong winds during the past few weeks have set up currents which moved sewage-polluted zones of lake water close to the supply intake cribs.

The bacterial quality of the raw water varied greatly during this period. In addition to excessively large numbers of the B. coli group the raw water also contained abnormal numbers of chlorine-resistant organisms of the spore-forming type such as B. welchii. These laboratory findings, however, were not considered unusual since similar characteristics of the water supply have frequently been observed in the past according to water department officials.

Indiana Waterworks Men Discuss Fire Protection

Means of providing better fire protection for Indiana communities provided the main theme for discussion April 9 as the 29th annual meeting of the Indiana Section of the American Water Works Association came to a close at Purdue University with approximately 150 in attendance.

The entire morning program was devoted to various phases of the rôle played by water departments in fire protection, with systematic inspection of all water and fire department equipment being advocated as an effective means of cutting fire losses. The speakers included Clarence Goldsmith, assistant chief engineer of the National Board of Fire Underwriters, Chicago, Ill.; Richard E. Vernor, manager of the fire prevention department of the Western Actuarial Bureau, Chicago; A. J. Meyer, of the Indiana Inspection Bureau, Indianapolis, and C. Smith, chief of the Fire Marshal Department of the Indiana State Department of Public Safety.

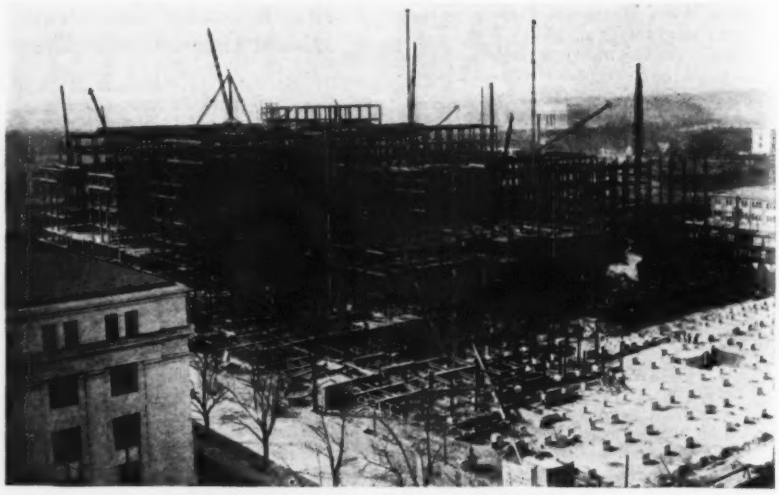
A varied program was presented in the

afternoon. Miller Hamilton, publicity director of the Indianapolis Water Co., discussed publicizing the utility, while a special motion picture provided an added feature. A discussion by N. Coleman, of the Richmond Water Works Corp., and a television demonstration by Purdue engineers brought the meeting to a close.

Frank A. Barbour, of Boston, president of the American Water Works Association, and W. W. Brush, treasurer, who is also editor of *Water Works Engineering*, were the principal speakers at the banquet on April 8 which was followed by a business meeting and election of officers.

D. A. Poole, chief engineer of the Indiana State Division of Public Health, was elected president to succeed C. K. Calvert, of Indianapolis; John Ford, of Wabash, vice-president; John A. Bruhn, Indianapolis, secretary-treasurer; J. F. Brady, Valparaiso, assistant secretary-treasurer; W. C. Mabee, Indianapolis, director.

The organization adopted resolutions urging that laws be enacted providing for the licensing of water works superintendents as a means of safeguarding water supplies, and also asked that the operation of water companies be left under the supervision of existing federal and state agencies instead of being placed under the newly-proposed national organization.



STEEL WORK FOR THE NEW INTERIOR BUILDING

The cornerstone for the new Department of the Interior building was laid on April 16 by President Roosevelt. Scheduled for completion in sixteen months of construction time, the new building rapidly takes form in the northwest rectangle, facing Constitution Ave. between 18th and 19th Sts., Washington, D. C. The building has a center section two blocks long and has six transverse wings on each side. It will have a basement and seven floors, with an eighth floor in the center section.

The building, which is 575 ft. long and 382 ft. wide, with a floor area of 1,050,000 sq.ft., is being built for the Interior Department with PWA funds. Excavation was started on Aug. 12, 1935, and the contract calls for completion by Dec. 17, 1936.

Bills Provide for Surveys In Flood Control Work

President Roosevelt has signed bills providing for the preliminary examination, with a view to controlling floods, of the following: Onondaga Creek, N. Y.; Republican River, Smokey Hill River, and minor tributaries of the Kansas River, and the Suwanee River, Fla.

The Senate Committee on Commerce has reported favorably two Senate bills authorizing preliminary examinations of the Delaware River and of the Sabine and Neches Rivers; and House bills authorizing similar examinations of the following: Greenbrier River and tributaries, W. Va.; Cheat River, W. Va.; Potomac River; Marais des Cygnes River, Kan.; Yakima and Walla Walla Rivers, Wash.; Chickasawha River, Miss.; Cosatot River, Ark.; Red and Little Rivers, Ark.; Little Missouri River, Pike Co., Ark.; Petit Jean River, Ark.; Big Mulberry Creek, Ark.; Cadron Creek, Ark.; Lowell Creek, Alaska; Matanuska River, Alaska; Passaic River, N. J.; San Diego River, Calif.

Two bills liberalizing loans to drainage, irrigation and conservation districts have been passed by the House.

Government Leadership Urged In Power Development

Integration of power development with the planned development of flood control, navigation, water storage and soil conservation, the whole to be subject to a social control under the leadership of the government, was proposed, April 16, by Morris L. Cooke, Administrator of rural electrification.

Mr. Cooke, who is also vice-chairman of the National Power Policy Committee, declared that recent floods have given renewed impetus to the drive for comprehensive national planning as to soil, water and power. He pointed to a need for action to prevent major catastrophes and to control water so as to make it a useful rather than a destructive force. Citing the need for an integrated program for development of the water resources, soil conservation, and hydro-electric development, Mr. Cooke affirmed that such a program would require a maximum social control of power supply as well as of waters. He also stated that cooperation by and with private interests would be mutually helpful, but the burden is too great for private enterprise, and that leadership must fall to government.

Contract Awarded for New Steel Plant

Jones & Laughlin Steel Corp. has awarded the contract for the construction of a new continuous sheet and strip mill at Pittsburgh to the Merritt-Chapman & Scott Corp., New York, and Jerome A. Utley, Detroit. The construction contract amounts to about $1,500,000, and the owner furnishes all structural steel, reinforcing and pipe piles. Equipment for the mill will be furnished by the Mesta Machine Co. and the General Electric Co. The mill will cost almost $20,000,000.

Susquehanna River Flood Flows

The Susquehanna River, at Binghamton, N. Y., during the March floods reached a stage of 18.01 ft. on March 13 and a stage of 22.85 ft. on March 18. The flood stage at Binghamton is 14 ft. The stage on July 9, 1935, was 17.72 and the highest recorded stage prior to 1936 was a stage of 20.41 ft. in 1865. The river stage and discharge data table in the *Engineering News-Record* of March 26, 1936, p. 443, gives the previous record stage for the Susquehanna at Binghamton as 24.80 ft., which was the stage reached by the Chenango River at Binghamton on July 8, 1935.

Short Course Attracts Sewage Plant Operators

The short course for sewage plant operators held at Rutgers University, New Brunswick, N. J., under the direction of the College of Engineering, in cooperation with the New Jersey Sewage Works Association and the New Jersey State Department of Health, was attended by sixteen men, most of whom were sewage plant operators from the state of New Jersey. The course, which lasted from March 23 to April 3, included, besides lectures and laboratory exercises, inspection trips to various plants in New Jersey. Sewage treatment of various types was discussed as were sewer construction and hydraulics. Instructors in the short course included Dr. Willem Rudolfs, professor of water purification and sewage; H. N. Lendall, professor of municipal and sanitary engineering.

Wagner Housing Bill Backed by Ickes

Senator Wagner's bill to appropriate $51,000,000 for grants to local housing authorities initiating low-rent housing projects was personally indorsed in hearings before the Senate Labor Committee this week by Administrator Ickes. Mr. Ickes explained that he could not speak officially because he did not know whether the expenditures proposed during the first year of the bill's operation are in line with the President's budget program.

Administrator Ickes strenuously objected to a provision placing administrative powers in a U. S. Housing Authority, of which he would be an ex officio member. Insisting that a single executive "can function much better than a board," he argued that the bill would place the Secretary of the Interior in an anomalous position of apparent responsibility but almost entire lack of authority.

Engineers Discuss Beach Protection

Florida engineers at annual meeting endorse measure for federal aid in shore protection and discuss Florida canal

AN ENDORSEMENT of the Senate bill providing for aid from the federal government in the construction of beach protection works was given by the Florida Engineering Society at its joint meeting with the American Shore and Beach Preservation Association at Daytona Beach, Fla., April 2-4. Reports of the first and second sessions of the meeting were included in last week's issue of *Engineering News-Record*. The third and fourth sessions were concerned with the Atlantic-Gulf canal and beach and shore erosion, respectively.

The bill which was endorsed by the Florida Engineering Society was explained to the convention by J. Spencer Smith, president of the American Shore and Beach Preservation Association. The bill, which was introduced into Congress by Senators Barbour and Moore, would make it the declared policy of the government to assist in the construction, but not the maintenance, of the works for improvement and protection of beaches and shores. Under the provisions of the bill, the Beach Erosion Board, organized under the Rivers and Harbors Act of 1930, would make investigations to determine the most suitable methods of beach protection and the restoration of beaches. In discussing the bill, Mr. Smith held out that the beaches belong to the people of the country and thus it became the duty of the federal government to assume the responsibility of caring for the beaches.

Col. Earl I. Brown, Corps of Engineers, in a discussion of shore erosion, pointed out that the change of coastline is the result of natural forces, and that recession is a geological process which must continually be taken into account. Col. Brown further pointed out that prior to the establishment of reasonably permanent structures near the shore line, recession, within limits of a few years, was not of serious consequence to anyone as the beach still maintained all of its characteristics, except in rare cases. It was held that under these conditions protective measures to fix and stabilize the beach were clearly unnecessary and uneconomical undertakings.

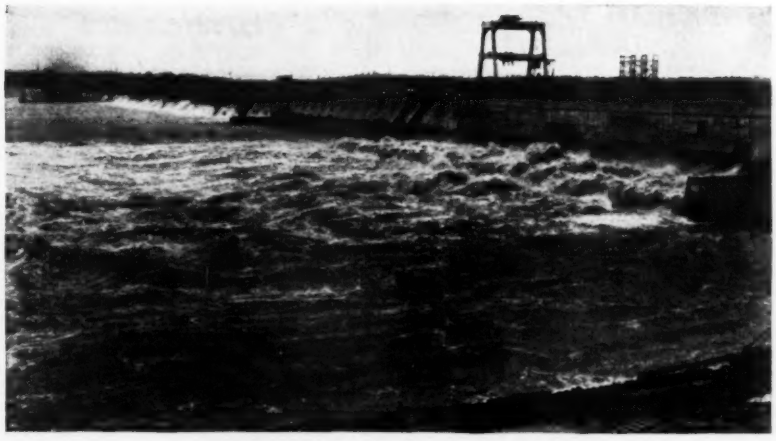
Seacoast protection becomes a matter of public concern only when concentration of use and development has led to the creation of cities or a concentration of homes.

That the federal government should be responsible for protective work was pointed out to be a fallacy inasmuch as it is only private or municipal property that is liable to destruction by erosion and not the beaches themselves.

Work on the Daytona Beach preservation project was discussed by C. H. Moneypenny, Daytona Beach. This work consists of a survey being carried on by the Daytona Beach Beach and Shore Preservation Committee, the U. S. Beach Erosion Board and the Engineering Experiment Station of the University of Florida. The survey is to develop the most practicable methods of protecting the 25-mile long beach.

The work of the engineering experiment station of the University of Florida was discussed by Dean Blake R. Van Leer. The College of Engineering was made, in 1932, the official agency dealing with the U. S. Beach Erosion Board in the study of beach and shore protection problems. Dean Van Leer also described the work being carried out by the American Shore and Beach Preservation Association.

During the Atlantic-Gulf canal session, a paper was presented on the inception of the Atlantic to Gulf waterway by Col. D. A. Youngberg who also read the report of the committee on rivers, harbors and waterways.



WHEELER DAM PASSES ITS FIRST FLOOD

The first large flood in the Tennessee River, since construction of Wheeler Dam was begun, reached the dam late in March as the work was nearing completion. To pass floods during the closing of the main dam, the sluiceways, forming the intakes for a future extension of the power house, had been left open. This picture shows the discharge through those openings coming down into the substructure for the future power plant. A considerable amount of the flood flow, which amounted to 220,000 sec.-ft. when this picture was taken, went over the completed sections of the spillway, shown beyond the non-overflow section of the dam which adjoins the power house.

American Road Builders Plan Active Program

With a 50 per cent increase in its budget, the American Road Builders' Association mapped an active program for the year at its annual business meeting in Washington April 16-17. Invitations for its next convention were received from a score of cities that will be considered by the joint exhibit committee, to meet on a date not yet fixed.

The decision was reached in a joint meeting of the Road Builders and the Manufacturers Division to schedule the road show in off-legislative years and focus interest on the convention's program in intervening years.

Col. Willard T. Chevalier was installed as president of the association. The new officers and directors were presented at the president's supper in honor of William P. McDonald, the retiring president. Among the speakers were Rep. Cartwright, of Oklahoma, in charge of the federal-aid highway bill which passed the House April 16, and Senator Hayden, of Arizona, who will take charge of this legislation in the Senate. Charles M. Upham, engineer-director of the association, presided as master of ceremonies.

The Manufacturers' Division, City Officials' Division, County Highway Officials' Division, and Highway Contractors' Division discussed their programs for the year in group meetings. The activities of the Highway Contractors' Division will be considerably expanded by employing a field worker and also a representative in the association's Washington office.

The County Highway Officials' Division reviewed the progress of its study of county finances and county administration of highway work. A committee was appointed to offer its cooperation to the U. S. Bureau of Public Roads in drafting regulations for the administration of the new $25,000,000 allotment for secondary and feeder roads carried by the pending federal-aid highway bill. The members of this committee are John A. Long, county engineer, Duval County, Fla.; O. S. Hess, engineer manager, Kent County Road Commission, Grand Rapids, Mich.; H. G. Sours, county engineer, Summit County, Akron, O.; and J. W. Mavity, county engineer, Harvey County, Newton, Kan.

Overton Flood Bill Passed by Senate

The Overton flood control bill providing $272,000,000 for control works on the lower Mississippi River was passed by the Senate, without a record vote, on April 21. The bill will now go to the House. Introduced by Senator Overton, the bill provides for work to be done in Louisiana, Mississippi and Arkansas, and further provides for the abandonment of the Bouef floodway as soon as the Eudora floodway is in operating condition. It also provides for the raising of levees to the 1928 grade and section. A feature of the Overton bill is the setting up of a new procedure for obtaining private property. The bill limits to $20,000,000 the amounts that may be paid for options in the Eudora and Morganza floodways. A limit of $2,250,000 is the maximum amount that may be paid for options on 75 per cent of easements in the floodway west of the Atchafalaya River.

On the same day the Rivers and Harbors Board of the Army Engineers recommended to the House Committee a $2,380,000 improvement program for the Columbia River from the Willamette to Bonneville.

Emil Larsson, Bridge Builder, Dies at 72

Emil Larsson, chief consulting engineer of the American Bridge Co. prior to his retirement because of ill health in 1933, died at Winter Haven, Fla., on April 1. To the profession he was known as one of the great bridge engineers of his generation. Few of the major steel bridges constructed in America during the last quarter century or more were built without aid of his skill and resourcefulness in both design and erection problems.

Carl Gustaf Emil Larsson, born in Sweden in 1864 and educated at the Technical High School in Stockholm, was trained in both mechanical and civil engineering, taking his final degree in 1887. Coming to this country soon after completing his education, he served in the engineering departments of the Wrought Iron Bridge Co. and the Edge Moor Bridge Works (1888 to 1900), rising to the position of principal assistant engineer. Upon the formation of the American Bridge Co. he went to Pencoyd as designing engineer, and soon was placed in charge of engineering in the company's eastern division. In 1904 he was appointed assistant chief engineer, with headquarters first at Pittsburgh and later at New York. On the death of Charles W. Bryan, chief engineer, in 1927, he was promoted to the position of chief consulting engineer, the late James H. Edwards becoming chief engineer. Some years later he suffered a stroke, which later compelled him to retire from active work.

Among the notable structures to whose successful execution Mr. Larsson made decisive contributions are the Hell Gate arch bridge of the New York Connecting R.R., the Bessemer & Lake Erie bridge across the Allegheny River, the renewal of the Cincinnati Southern bridge over the Ohio at Cincinnati, the Ohio Connecting R.R. bridge at Brunots Island, Pittsburgh, and many others of comparable magnitude and difficulty. On the B.&L.E. bridge he originated the modern method of jacking continuous truss spans to the desired reaction. In the case of a number of these structures the very possibility of building and erecting the bridge was in question until Larsson devised methods to overcome the difficulties. Replacement of the long spans of the Ohio Connecting bridge at Pittsburgh under traffic, through the expedient of using half trusses of the secondary spans as counterweight for the cantilever erection of the longest span, was also due to his planning, though he had used the same method on a smaller scale 20 years earlier in the construction of a bridge over the Fraser River when he was in the employ of the Edge Moor Bridge Works.

Emil Larsson had the gifts, the training and the mental attitude of the true engineer. His judgment of conditions was exceptionally objective and precise, and his command of technical resource as well as his ingenuity in dealing with unusual difficulties was widely acknowledged. Aside from purely structural problems he contributed also to improvement of the materials of the art. He played a large part in bringing silicon steel into use as a high-strength material for large bridges and heavy members, and was chiefly responsible for the development of heat-treated eyebars for tension chords in large truss bridges, used also in the suspension chains of the Florianapolis bridge in Brazil.

Brief News

AUTHORIZATION to seek permission from the War Department and from Congress for construction of a bridge from Brooklyn to Staten Island was given to Mayor La Guardia of New York City on April 17. A bridge across the Narrows, the entrance to New York harbor, has been discussed for a number of years. The War Department has previously disapproved of such a bridge, but it is the hope of city officials that the Golden Gate bridge has provided a precedent for a bridge across the entrance to an important harbor.

WORK ON A SURVEY of the Red River area between Denison and Shreveport, Tex., will probably get under way in the near future, as it is reported that the $500,000 allocated for the work has been made available. The survey work, which will be carried out by the Corps of Engineers, is to determine the possibility of building a dam at Denison for flood control. The proposed dam would cost about $36,000,000.

THE CONSTRUCTION of about 336 grain elevators in Argentine at a cost of about $28,000,000, is reported by the Canadian Press as being contemplated by the Argentine Ministry of Agriculture. The report states that, on April 20, bids for the first units to be constructed under a four year program would be called. The plan proposes construction of 15 terminal elevators at seaports and 321 elevators at primary markets in the interior.

SOCIETY CALENDAR

NATIONAL RIVERS AND HARBORS CONGRESS, annual meeting, Washington, D. C., April 27-28.

AMERICAN WATER WORKS ASSOCIATION, annual meeting, Los Angeles, Calif., June 8-12.

SOCIETY FOR PROMOTION OF ENGINEERING EDUCATION, annual meeting, Madison, Wis., June 23-26.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

THIRD WORLD POWER CONFERENCE, Washington, D. C., September 7-12.

PUBLIC WORKS CONGRESS, joint meeting, AMERICAN SOCIETY OF MUNICIPAL ENGINEERS AND INTERNATIONAL ASSOCIATION OF PUBLIC WORKS OFFICIALS, Toronto, Ont., September 28-30.

AMERICAN SOCIETY OF CIVIL ENGINEERS, regional meeting, Columbus, Ohio, May 15-16.

NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS, annual meeting, New York City, May 23.

BUFFALO SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS, on April 15, elected the following officers: WILLIAM P. FEELEY, president; GEORGE MINNISS, vice-president; STEWART S. NEFF, secretary-treasurer.

LOUISIANA SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS, on April 15, elected the following officers: president, C. H. STERN; vice-presidents, H. A. SAWYERS, W. H. RHODES; secretary, C. M. KERR; treasurer, A. J. NEGROTTO.

Prof. A. H. Beyer, Materials Testing Expert, Dies

Albin Hermann Beyer, since 1920, professor of structural engineering and for ten years head of the civil engineering testing laboratories at Columbia University, died on April 19, after a prolonged illness that followed an operation last January. Prof. Beyer, who was 55 years old at the time of his death, was best known for his activities in testing construction materials, a type of work which is handled in considerable volume at the University laboratories. His principal interest was in reinforced concrete, although he often assumed personal supervision of tests of steel, timber and new synthetic materials.

Professor Beyer, born in Germany, came to the United States in 1893. Graduated from Columbia in 1903, he spent the next two years as an instructor at Cornell, going from there to work on railroad location in Indiana. From 1909 to 1913 he was chief engineer for Alexander Potter, consulting engineer, New York. In 1917 he went to Columbia and continued in teaching and research there until his death.

Obituary

JOHN CARROLL CHASE, a civil engineer associated with southern water works construction for many years, died at Boston, Mass., on April 15 at the age of 86. He was a native of Chester, N. H., and after graduating from the Massachusetts Institute of Technology in 1874 was employed for a time on the Manhattan Elevated Railroad in New York City, later being superintendent of the Clarendon Water Works, Wilmington, N. C. He spent the next 17 years in water supply work in the Carolinas and Georgia, after which he entered the manufacturing field at Derry, N. H.

ARTHUR S. HILL, former chairman of the water and sewerage commission at Wakefield, Mass., died at his home there on April 16 at the age of 56.

HARRY G. LEE, engineer and president of the Standard Bithulithic Co., New York, died at his home in South Orange, N. J., on April 16 at the age of 49. Mr. Lee, who had been assistant city engineer of East Orange from 1909 to 1911, was graduated from Lafayette College in 1908.

Personals

C. CLARKE KEELY, formerly a member of the engineering staff of the Metropolitan Water District of Southern California, has entered private practice as consulting engineer, with offices in Los Angeles.

JAMES B. HAYS, former consulting engineer for the Bureau of Reclamation, has been appointed engineer in charge of the construction of Chickamauga Dam by TVA. Mr. Hays, in the two years past, has been associated with the Bureau of Reclamation, and prior to that he was with the Aluminum Company of America from 1926 to 1934, as resident engineer on dam work.

WILLIAM E. R. COVELL, Major, Corps of Engineers, and assistant engineer of maintenance, Balboa Heights, Canal Zone, has been transferred to the Pittsburgh area. He will succeed MAJOR W. D. STYER, who is to go to Panama.

JAMES H. KIMBALL, chief meteorologist in New York for the U. S. Weather Bureau, has been appointed to the faculty of New York University.

BYRAM W. STEELE has been appointed chief design engineer for the Tennessee Valley Authority. Mr. Steele had previously been with the Bureau of Reclamation, Denver, Col., where, since 1920, he has been connected with the design of irrigation

and flood-control projects, and while with the Bureau, he supervised to some extent the design of Norris and Wheeler dams for TVA. Mr. Steele will have administrative charge of the engineering design department at Knoxville.

COL. BREHON SOMERVELL has been detailed as technical advisor for the Georgia area devastated by the recent tornado. He will be assisted by CAPT. H. L. PECKHAM, general engineer; COL. CLARENCE E. BOESCH, municipal engineer; and RALPH E. DIPPELL, architect.

GEORGE C. WILLSON, formerly superintendent for the MWAK Co. on the construction of the Grand Coulee Dam, Washington, has become general superintendent for the Lindholm Construction Co., Pittsfield, Mass., which has the contract for building the Sand Wash dam and reservoir for the city of Pittsfield. Mr. Willson, who is a graduate of the Virginia Polytechnic Institute, has had wide experience in the construction field in the United States and in South America.

PROF. HAROLD M. WESTERGAARD of the University of Illinois, and adviser for the Bureau of Reclamation in connection with construction at Boulder Dam and other projects, has been appointed Gordon McKay professor of civil engineering at Harvard University. He has been on the Illinois faculty since 1916, and in 1921 was awarded the Watson Medal of the American Concrete Institute.

MAJOR WILLIAM F. TOMPKINS, Corps of Engineers, has been transferred from Washington to New Orleans to take charge of the Second New Orleans District, effective May 20. He will succeed LIEUT. COL. JOHN H. CARRUTH, in charge for the past three years, who will become district engineer at Norfolk, Va., about June 15.

OLE SINGSTAD, who was chief engineer during the construction of the Holland tunnel, has been appointed chief engineer of the New York Tunnel Authority which is planning to build the East River tunnel. Mr. Singstad is also consulting engineer on tunnels to the Port of New York Authority. WILLIAM MCKENNA GRIFFIN, division engineer for the Board of Transportation, will be assistant chief engineer, and JACOB MECHANIC will be chief construction engineer. JAMES A. DUGAN has been appointed chief engineer of design with J. H. QUINBY as assistant.

CONSTRUCTION STATISTICS FOR THE WEEK

ENGINEERING construction awards at $29,081,000 are lower for the week, the lowest volume recorded this year. This is still 40 per cent ahead of the corresponding week last year. The drop is due to low state and municipal awards. Private awards although lower than last week are up to the average week for the year to date. This week's total is made up of private, $11,564,000; public, $17,517,000; federal, $1,518,000; state and municipal, $15,999,000. Corresponding values for 1935 are: total, $20,677,000; private, $7,385,000; public, $13,292,000; federal, $2,908,000; state and municipal, $10,384,000.

Commercial buildings establish a new high volume this week, $7,206,000. Other classes of work, particularly public buildings and highways are lower than last week. The total volumes of awards for these classes of work are: industrial buildings, $2,895,000; public buildings, $3,328,000; highways, $7,021,000; bridges, $1,441,000; sewerage, $2,077,000; waterworks, $1,375,000; earthwork, drainage, $546,000; while unclassified types reached a total of $3,192,000.

The larger awards for the week include: grain elevator at Denver, Colo., for Nebraska Consolidated Mills, Omaha, $350,000; steel sheet mill and strip mill, Jones & Laughlin, Pittsburgh, Pa., $1,500,000; 140 houses, own forces, Teaneck Bldrs., Inc., Teaneck, N. J., $1,000,000; highways, by Mississippi, $681,000; by Ohio, $695,000 and $605,000; by Oklahoma, $578,000; sewage disposal plant, New Britain, Conn., $337,000; sewage pumping station 21, also installing sewers various streets, New Orleans, La., $527,000; sanitary sewers, relief labor, Poughkeepsie, N. Y., $314,000; airport improvements, Oakland, Calif., $344,000; 25,000 tons steel rails, B. & O. R.R., Baltimore, Md., $825,000.

New capital for the week includes RFC loan to Metropolitan Water District of Los Angeles, $11,808,000 and state and municipal bonds sales, $8,950,000.

CONTRACTS
(Thousands of Dollars)

	Weekly Average Apr. 1935	Prev. 4 Weeks	Week Apr. 23 1936
Federal Government	$4,661	$1,001	$1,518
State and Municipal	13,972	26,073	15,999
Total public	$18,633	$27,074	$17,517
Total private	10,610	13,592	11,564
Week's total	$29,243	$40,666	$29,081
Cumulative to date:			
1935...$424,283,000	1936...$760,877,000		

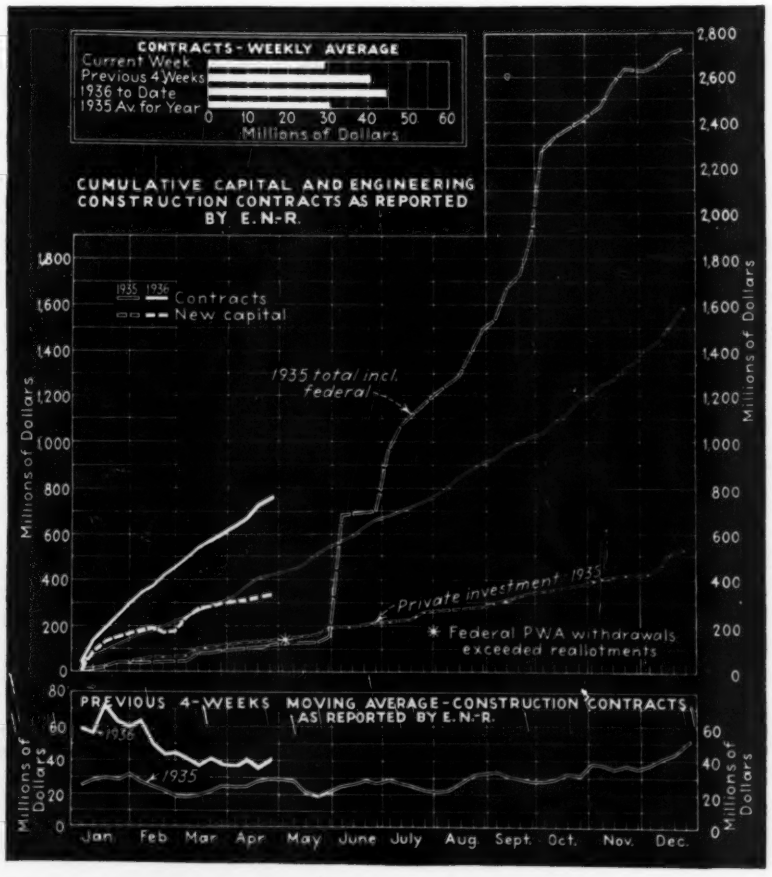
NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1936	Week Apr. 23	Cumulative
State and municipal	$8,950	$170,954
PWA non-federal	....	49,644
RFC loans	11,808	36,808
Corporate issues	....	79,476
PWA loans, Private	....	1,270
Total Non-Federal	$20,758	$338,152
Federal	....	4,955
Total new capital	$20,758	$343,107
Cumulative to date:		
1935...$116,892,000	1936...$343,107,000	

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds. An arbitrary percentage (25%) of the WPA allotments and local contributions to WPA work is included to allow for the capital additions through the Works Progress Administration division of the new program.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Apr., 1936	202.20	97.20	Mar., 1936	160	70
Mar., 1936	201.20	96.71	Feb., 1936	176	77
Apr., 1935	194.50	93.49	Mar., 1935	101	44
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47



Construction Equipment and Materials

Marking Straight Edge for Paving Irregularity

A marking straight edge used to detect and mark bumps and irregularities in paving surfaces has been developed by J. R. Benson and J. Lundberg, Topeka, Kan. The marking of the irregularities is automatic. The machine is adjusted by a simple

screw mechanism to the desired tolerance and run over the surface, the high places raise the center wheel thus opening a valve mechanism, causing the fluid to run out and mark the surface.

The fluid is carried in the tank on the rear of the machine and one filling of the tank will, on ordinary paving, last for more than 5,000 lineal ft. of a 20 ft. slab.

The accompanying photograph shows the "Pavometer" marking the high spots on a bridge floor under inspection.

Concrete Vibrator for Standard Finishing Machine

A machine recently developed by the Flexible Road Joint Machine Co., Warren, Ohio, provides for the internal vibration of concrete throughout the full width of the highway slab. The attachment fits on the standard road finishing machine. It consists of a rigid transverse frame supported independently on springs and rubber-tired wheels to eliminate transmission of the vibration to the steel forms. The entire frame is vibrated by a mechanical vibrator. The transverse shaft, attached to the frame, supports 150 rotary vibrating elements which move in and out of the concrete, penetrating it to a depth of 5 in. The machine operates at about 3,600 vibrations per minute.

Window Frame Attachment Allows Sash to Pivot

A window fixture which permits the sash to be tilted inward at the midrail and at the top, in addition to sliding up and down in the conventional manner, has been announced by the Howard Safety Window Co., Milwaukee, Wis. The fixture, which permits room ventilation without drafts, may be applied to any standard sliding window.

A metal shoe, supporting the sash, slides in a metal channel to permit the window to be raised or lowered in the conventional manner. The sash is attached to the shoe by a pivot so that the sash may be swung inward. The sash is independent of the sash weight cords which operate on the sliding shoe.

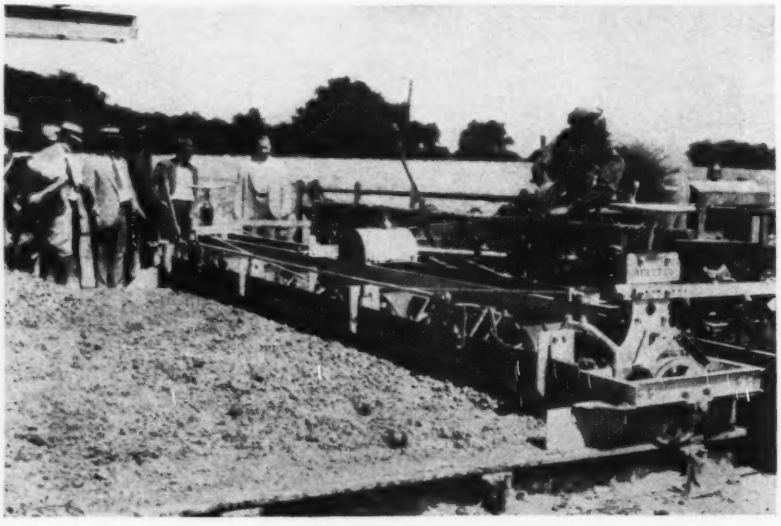
New Equipment in Brief

Shallow Well Pumps. A high lift turbine pump for shallow wells and cisterns is now being marketed by the Roots-Connersville Blower Corp., Connersville, Ind. This pump combines some of the advantages to be found in the rotary positive and centrifugal pumps. Water can be lifted up to 25 ft. under average conditions. There is only one moving part; the balanced impeller. The pump is of a compact size and is self-priming and fully automatic.

Woven Brake Lining. A woven brake lining designed for severe service conditions under excessive loads has been developed by the Gatke Corp., Chicago, Ill. This brake lining is made by combining soft zinc alloy wire with asbestos fibre. The material is then impregnated with a high heat-resisting resinous compound. The lining is then oil-proofed by hydraulically compressing and by baking. The woven lining is made in sizes up to 14 in. in width and 1¼ in. thick.

Diesel Ignition Plugs. An electric glow plug designed for overcoming starting difficulties in diesel compression-ignition engines has been developed by the Edison-Splitdorf Corp., West Orange, N. J. These plugs, which are to maintain a good hot temperature in the combustion chamber during the starting period, are of the double electrode type obtaining a heat in the coils of 2,000 deg. F. in from 15 to 30 seconds.

Soft Material Drill. For use in drilling soft iron ore, anthracite, gypsum, limestone, slate, shale, frozen ground, or any sticky formation, the Sullivan Machinery Co., Chicago, Ill., has designed the H-2 auger drill. By means of a simple change, however, the machine can be made into a drill that will give good service in hard rock. Because of a high stalling torque, which results in an extra strong rotation, the H-2 is consequently less likely to stall.



Business Notes

THE TRACTOR & EQUIPMENT CO. has opened a display room at 431 So. Jefferson St., Chicago, Ill., where it will carry a full line of construction machinery.

GENERAL REFRACTORIES CO., Philadelphia, Pa., has appointed Braman, Dow & Co., Boston, Mass., as dealer for the Boston area.

LINK-BELT CO., Chicago, Ill., has announced that Alfred Kauffmann has been elected president to succeed George P. Torrence. Mr. Kauffmann has been with the Link-Belt Co. for the past 35 years.

HILL DIESEL ENGINE CO., Lansing, Mich., has appointed James M. Degnan as sales manager to succeed Fred E. Mengel, resigned. Mr. Degnan has been associated with the Worthington Pump & Machinery Corp. for the past ten years.

TRUSCON STEEL CO., Youngstown, Ohio, has appointed W. V. Peters to the position of manager of the steel window and door department. Mr. Peters entered the employ of the Truscon Steel Co. seventeen years ago.

New Publications

RO-TWIN AIR COMPRESSORS, Allis-Chalmers Co., New York City. 8½x11, 4 pages. Bulletin 2218.

SAFE STEELS FOR SUB-ZERO SERVICE, International Nickel Co., Inc., 8½x10¾, 11 pages.

HEISLER FIRELESS LOCOMOTIVES, Heisler Locomotive Works, Erie, Pa. 8½x11, 8 pages.

INSULATING FIREBRICK, Babcock & Wilcox Co., New York City. 8½x11, 10 pages.

MATERIALS HANDLING EQUIPMENT, Lewis-Shepard Co., Boston, Mass. Circular No. 318, 12x18.

SINGLE ROLL CRUSHER, Jeffery Manufacturing Co., Columbus, Ohio. 7½x10½, 19 pages.

UNMATCHED SAFETY, Four Wheel Drive Auto Co., Clintonville, Wis. 8½x11, 21 pages.

ASPHALT SURFACES, The Asphalt Institute, New York City, 8½x11, 8 pages.

READ THE RECORD, Cummins Engine Co., Columbus, Ind. 9x12, 28 pages.

WHY OHIO MOTORS ARE RELIABLE, Ohio Electric Mfg. Co., Cleveland, Ohio. 9½x12, 16 pages.

THE USE OF WROUGHT IRON IN SALT WATER SERVICES, A. M. Byers Co., Pittsburgh, Pa. 8½x11, 16 pages.

ANOTHER GREAT ADVANCE IN STOPE-HAMERS, Ingersoll-Rand Co., New York City. 8½x11, 4 pages.

THE IOWA SUPER STRAIGHT LINE, Iowa Mfg. Co., Cedar Rapids, Iowa. 16 page folder. Gravel Crushing Plants.

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Colo., Grand Junction—City plans expending $55,000 for waterworks and electric light plant improvements. F. Kennan, Grand Junction, engr.

Conn., New Britain—City, Bd. Water Comrs., will select consulting engineer to design standpipe for high service reservoir. $50,000. G. Molleur, City Hall, engr. Noted Jan. 14, C. D. —Jan. 16, E. N.-R.

Mass., Methuen—Town, T. W. Gunter, chn. Bd. Selectmen, Town Hall, plans 1 story, brick, steel, concrete, iron removal plant. $20,000. Engineer not appointed. Investigating Committee appointed. A. L. Huckman, chn.

★**N. Y., Binghamton**—City made extensive survey for rehabilitation of present water supply system, incl. new intake from Susquehanna River, pumps, filters, and other equipment, constructing 10 m.g. rein.-con. storage reservoir, $911,000. A special commission headed by E. H. Prentice, recommended immediately action on project. G. A. Giles, city engr. Noted Sept. 10, C. D.—Sept. 12, E. N.-R.

N. Y., Palmyra—Village election Apr. 28, to vote on proposition to construct filtration system in connection with new waterworks system. $36,000. Engineer not appointed.

N. C., Bryson City—Town plans waterworks improvements. $67,272. Application filed with P.W.A. for loan and grant. W. E. Elmore, mayor.

N. C., Cornelius — Town plans waterworks improvements. $34,545. Application filed with P.W.A. for loan and grant. H. K. Sossoman, mayor.

N. C., Lincolnton—Town plans water and sewer improvements. $58,818. Application filed with P.W.A. for loan and grant.

★**Okla., Oklahoma City**—City made preliminary plans surveys to start soon for constructing water supply. To exceed $1,000,000. T. G. Banks, city engr.

Okla., Oklahoma City—Empire Co., preliminary plans drilling three 600 ft. water wells in Oklahoma City oil field. $30,000. Private plans.

Okla., Oklahoma City—Phillips Petroleum Co., Bartlesville, made plans drilling five 600 ft. water wells in Oklahoma City oil fields. $50,000. A. H. Riney, Bartlesville, engr.

Pa., Allentown—City made plans two new reservoirs for municipal water system, 1 unit, 556x278 ft. built on Lehigh Mountain, incl. 18,000 yd. cement, 3,000,000 lb. steel; and other 178x378 ft. built in 14th Ward, 7,600 yd. cement, 1,500,000 lb. steel, both covered and buried below surface. Project submitted to P.W.A. for final approval. Morris Knowles, Inc., Westinghouse, Bldg., Pittsburgh, engr.

Pa., Allentown—City plans 6 in. c.i. watermains in Lynnwood and Montgomery Sts. **Maturity soon.** M. W. Gross, mayor.

Pa., Franklin—City plans purchasing, installing chlorinator equipment and water testing system at municipal waterworks. J. Snow, city engr., authorized to proceed with plans. **Maturity soon.**

S. D., Draper — City, J. Beach, aud., plans waterworks system. $25,000.

Tex., Taft—City, E. Burnet, mayor, waterworks and natural gas systems. $136,300. P.W.A. allotment rescinded. No other plans for financing. J. Ward, Wichita Falls, engr. Noted Nov. 4, C. D.—Nov. 7, E. N.-R.

Vt., South Burlington—Town, Water Dpt., Town Hall, plans water supply system. **Maturity indefinite.**

Ont., Bronte—Municipality plans new waterworks system.

Ont., Harrow—Municipality making plans new waterworks system. J. J. Newman, Windsor, engr.

Ont., Jarvis—Municipality plans new waterworks system.

Ont., Omemee—Municipality plans new waterworks system.

Que., Grand'Mere—Municipality making plans installing automatic chlorinator and extending intake pipe. J. C. Beigue, engr.

Que., Latuque — Municipality making plans new water supply system. $300,000.

Que., Lyster—Village making plans gravity water system using springs and creeks, involving 8 mi. pipe line.

Que., Montcerf—Village, municipality making plans 8,000 gal. concrete reservoir supply conduit, 800 ft. 2 in. and 300 ft. 3 in. galvanized pipe, distribution system of 1,000 ft. 3 in., 2,000 ft. 2½ in. and 2,000 ft. 2 in. pipe, pump, 25,000 gal. concrete distribution reservoir. $7,500.

Que., Noranda—Municipality plans being submitted to T. J. Lapraniere of Provincial Bd. Health for 365 ft. 20 in. c.i. pipe at Lake Dufnet, brick, concrete pumping station, motor driven centrifugal pump 3,000 g.p.m. capacity, small pump of 150 gal. capacity. $55,000.

Que., Roberval—Municipality, L. Binet, chn. Bd., making plans intake in du Tremblay River, provision of modern chlorinator and electrically driven pump.

Que., Sawyerville — Municipality plans by Provincial Bureau of Health, Quebec City, constructing 30x60x8 ft. concrete emergency reservoir. Noted Jan. 11, 1935, C. D.—Jan. 17, 1935, E. N.-R.

Que., Sutton—Municipality, A. J. Darragh, chn. Bd., making plans installing slow sand filter, disinfecting equipment and constructing new dam.

Que., Wottonville — Municipality making plans extension to present water supply and increase size of piping, install 50 g.p.m. pump with pressure tank, and for fire protection purposes installation of 300 g.p.m. pump, construction of 100,000 gal. storage reservoir, 6 in. pipe and hydrants. Contingent to purchase of private water system.

BIDS ASKED

★**Colo., Denver** — May 12, by Bd. Water Comrs., City and County Bldg., constructing Ralston Creek Dam, incl. constructing 900 ft. outlet tunnel through solid rock, Fraser River Diversion Project, 20 mi. northwest of here, 440,000 cu.yd. excav. for dam and appurtenant structures, 2,200,000 cu.yd. embankment for dam, 83,000 cu.yd. rock fill embankment, 60,000 cu.yd. rip rap and stone paving, 10,000 sq.yd. stone paving, 7,600 cu.yd. concrete, 480,000 lb. reinforcing steel, 248,000 lb. welded steel plate pipe, 40,000 lb. structural steel, and placing 265,000 lb. valves which will be furnished by the Board. $1,500.00. Col. H. Crocker, consult. engr. for Denver Water Bd.

Ga., Atlanta—See "Contracts Awarded."

★**Ill., Cicero**—Apr. 29, by City, J. C. Carny, mayor, improving waterworks. P.W.A. project. $1,090,000. C. DeLeuw & Co., 20 North Wacker Dr., Chicago, engrs. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

Mass., Marlboro—See "Contracts Awarded."

Mich., Detroit—May 5, by E. H. Bauer, acting secy. Dpt. Water Supply, No. 1 furnishing, delivering, placing filtration plant equipment, incl. 1,030 tons filter sand for 12 filter beds for Springwells Filtration Plant: No. 2 furnishing, installing vacuum cleaning equipment, incl. one 5 hp. and two 1 hp. portable vacuum cleaners, one 10 hp. central vacuum cleaning system. To exceed $23,000. P.W.A. project. G. H. Fenkell, 735 Randolph St., genl. mgr.

Mich., Gaylord—See "Sewerage and Waste Disposal."

Mo., Doniphan—See "Contracts Awarded."

N. Y., Monticello—A. H. Okun, engr., 16 Starr Ave., taking bids furnishing, erecting 200,000 gal. steel water storage tank for Monticello Steam Laundry Co., 10 John St., Monticello. To exceed $23,000. Owner builds foundations with own forces.

N. Y., Newburgh—See "Contracts Awarded."

O., Wellsville—City bids about May 10, drilling two emergency water wells on site of old First St. pumping station. $15,000. Money will be taken from waterworks reserve fund.

Ore., Salem—May 1, by City Recorder, constructing 10 m.g. gal. reservoir. Stevens & Koon, Salem, consult. engrs. Noted Apr. 1, C. D.—Apr. 9, E. N.-R., under "Contracts Awarded."

Pa., Daisytown—Apr. 30, by Borough Council, M. Lintner, secy., constructing complete municipal water supply system, incl. c.i. distributing mains, meters, pumping equipment, etc, O. P. Thomas, 502 Main St., Johnstown, engr.

Pa., Lock Haven—See "Contracts Awarded."

Ont., Port Arthur—See "Contracts Awarded."

LOW BIDDERS

★**Ala., Birmingham**—City, Apr. 10, 42- to 60-in. steel pipe for water system, joint bid from Ingalls Iron Wks. Co., 720 4th Ave. S., and Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill., $1,236,843. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

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C. D. Construction Daily
E. N.-R. Engineering News-Record
Federal Government projects symbol †

◆

CONTRACTS AWARDED

†**Calif., Mare Island**—Yards & Docks, Navy Dpt., Wash., D. C., water treatment and continuous blow-down system for Navy Yard Hospital, Spec. 8092, to Permutit Co., 330 West 42nd St., New York, N. Y., $6,280. Bids Feb. 5. Noted Jan. 9, C. D.—Jan. 16, E. N.-R.

Ga., Atlanta—City, filter plant addition to waterworks, incl. increase of capacity from 1,200,000 to 1,500,000 gal. per day, rein.-con. and stone construction, own forces. L. A. Walker, city purch. agt. City asked for appropriation and Council will act quickly. City Engineer, City Hall, engr.

La., New Orleans—Sewerage and Water Bd., constructing watermains in Algiers and Gentilly Rd., Diana St., General Meyer Ave., Contr. 202-W, to J. B. McCrary Co., 22 Marietta St. Bl., Atlanta, Ga., $47,826; 30 in. watermains in Magnolia and other streets, and 16 in. watermain in Calhoun St. from Willow St. to St. Charles Ave., to R. P. Farnsworth & Co., 212 Nashville Ave., $111,098. Bids Apr. 2, awarded Apr. 9. Noted Apr. 10, C. D.—Feb. 13, E. N.-R.

Mass., Marlboro—City, L. F. Granger, W.P.A. dir., City Hall, laying 4,900 ft. 6 in., 800 ft. 8 in. c.i. mains and 13 fire hydrants in Essex, Hildreth and Florence Sts., Cook Lane and Clover Hill, day labor. Est. $34,000.

Mo., Doniphan — City, waterworks improvements, incl. 75,000 gal. steel tank on tower, new pump and motor, system of c.i. distribution mains, etc., relief labor. W. A. Fuller Co., engrs., 2916 Shenandoah Ave., St. Louis. **W.P.A.** $10,000 bonds voted. Total $51,000. Noted Aug. 20, 1934, C. D.—Aug. 23, 1934, E. N.-R.

†**N. Y., Canandaigua**—Veterans Hospital, general contract water softening plant and equipment, to Werner Spitz Constr. Co., Comfort St., Rochester. General contractor awarded contract roofing, to W. H. Long, 513 South Clinton Ave., Rochester•••painting, to G. C. Guilbert, 509 Parsells Ave., Rochester•••stone, to General Stone Co., 621 Pullman Ave., Rochester. Noted Mar. 25, C. D.—Feb. 20, E. N.-R.

N. Y., Newburgh—City, constructing 825 ft. 8 in. and 375 ft. 6 in. c.i. pipe, 465 ft. house connections, hydrants in Wilkin St. from Dupont to Larter Aves., and 545 ft. in Larter Ave., relief labor. To exceed $23,000. **W.P.A.** C. R. Woodhull, city engr. D. Jordon, High School, Main St., White Plains, procurement officer W.P.A., will purchase material.

N. C., Canton—Town, Sect. 3, waterworks distributing mains and sanitary sewer extensions, to M. Y. Wilson & Co., Asheville, $44,460•••filter plant, to A. H. Guion, Kinney Bldg., Charlotte, $111,839•••plumbing, to G. W. Young, Asheville, $2,425. Grand total $158,724. **P.W.A.** Bids Apr. 1. Noted Mar. 19, C. D.—Mar. 26, E. N.-R.

N. C., Concord—Town, 5 mi. pipe line, pump house and pump, tank foundations, to Blythe Bros., 424 South Brevard St., Charlotte, $124,944; 500,000 gal. steel tank, to Chicago Bridge & Iron Wks., 1500 North 15th St., Birmingham, Ala., $25,975. Est. $183,636. **P.W.A.** Bids Mar. 11. Noted Mar. 19, C. D.

N. Y., Brooklyn—Dpt. Water Supply, Gas & Electricity, Municipal Bldg., New York, general equipment for pumping station at Neptune Ave. and West 23 St., Coney Island, to Turbine Equipment Co., 75 West St., New York, $107,550; electrical equipment and lighting, to E. J. Electric Installation Co., 227 East 45th St.,

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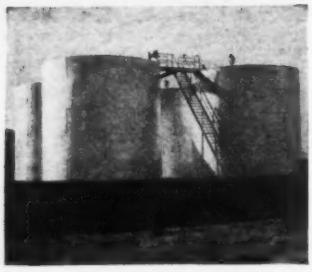

With ample material stocked, and plants at Pittsburgh and Des Moines, we can ship quickly and advantageously to locations either in this country, or for export. We can erect tanks for you, either by riveting or electric welding. Our welding is entirely by the shielded arc method. Write for quotation or catalog.

Pittsburgh DES MOINES STEEL COMPANY
3414 Neville Island, Pittsburgh
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Waterworks (Continued)

New York, $107,850. Awarded subject to P.W.A. approval. Bids Mar. 23. Noted Mar. 24. C.D.—Mar. 5, E. N.-R.

N. Y., Newfane—Town, suction well and filter plant, to W. L. Lose, 171 West Elmwood Park, Tonawanda; intake well and pipe lines, to F. Blair & Son, Hilton. Total est. $97,462. Bids Mar. 27. Noted Apr. 8, C. D.—Mar. 19, E. N.-R.

O., Cardington—Jennings Lawrence Co., engrs., Rowland Bldg., Columbus, Contr. 2, distribution system, for city, to Whitney Bros. & Co., Charleston, W. Va., $50,926•••Contr. 3, elevated tank, to W. E. Caldwell Co., 2215 Arthur Ave., Louisville, Ky., $10,559. **P.W.A.** Noted Apr. 3, C. D.—Apr. 9, E. N.-R.

O., Creston—City, Contr. C, distribution system, for waterworks system, to H. W. Baker, Wharton, $35,721; Contr. D, elevated tank, to Pittsburgh Des Moines Steel Co., Neville Island, Pittsburgh, Pa., $9,442. **P.W.A.** Noted Nov. 12, C. D.—Nov. 14, E. N.-R.

O., Leesburg—C. H. Teeter, city clk., Contr. 2, water treatment plant, for waterworks system, to W. F. Schmidt, 1413 Philadelphia Dr., Dayton, $11,206; Contr. 3, water-mains, to H. E. Miller, Columbus, $4,210. **P.W.A.** Noted Mar. 18, C. D.

O., Nevada—City, Contr. B, water treatment plant for waterworks system, to D. A. Richards, 501 West Walnut St., Painesville, $11,270. **P.W.A.** Bids Mar. 27. Noted Feb. 28, C. D.—Mar. 5, E. N.-R.

Pa., Lock Haven—Borough, repairs and replacements to water system, sewers, streets, public buildings and equipment at waterworks, damaged or destroyed by flood, day labor under supervision of R. S. Kift, boro engr. $252,000. **W.P.A.** project approved.

Tenn., Greenbrier—City, wells, pumps and distribution mains, to W. L. Hailey & Co., Nashville, $30,009; steel tank on tower, to R. D. Cole Mfg. Co., Newman, Ga., $7,468. **P.W.A.** Bids Nov. 13. Noted Nov. 7, C. D.

Ont., Port Arthur — Public Utilities Comn., R. B. Chandler, mgr., extending 6 in. watermains, day labor, under supervision of manager. Approximately $30,000.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Stockton—City Council, rescinded contract awarded after P.W.A. consideration for extending trunkline sewer, involving 5,225 lin. ft. 4 and 12 in. vitr. clay pipe, fifteen 5 ft. diam. manholes, 14,911 sq.ft. asphaltic pavement, 1 lamphole. Noted Apr. 13, C. D.—Apr. 16, E. N.-R. under "Contracts Awarded."

Calif., Willow Glen—City estimates of cost submitted to city trustees for sewerage system to connect with San Jose system, involving 110,000 ft. pipe, pumping system, etc. $300,000. H. N. Bishop, city engr.

Conn., Hartford—City plans repairing and rebuilding Potter St. and Commerce St. Pumping Stations damaged by flood waters. $34,000. R. N. Clark, city engr.

Conn., Norwich—State soon takes bids sewage disposal plant at Uncas on the Thames Sanatorium for Tuberculosis Comn., State Office Bldg., Hartford. $42,000. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

Conn., Portland—Town, plans ready early in May for sewage disposal plant, incl. 625 ft. dike around site masonry concrete wall, 10,000 cu.yd. earth fill, 1,000 cu.yd. stone rip rap, upstream face of dike 2 sedimentation tanks 10x12x52 ft., concrete sludge collecting equipment, two 20x20x20 ft. heated digestors, 40x90 ft. glass enclosed sludge bed, and a monorail sludge removal system, 4,600 ft. interceptor sewer line emptying into Connecticut River, $80,000. L. N. Germain, 135 Liberty St., Middletown, engr. Noted Jan. 9, C. D.—Jan. 16, E. N.-R.

Conn., Stratford—Town, W. Shea, mgr., preliminary survey for sludge, chemical disposal system, incl. pumping facilities, sludge beds, chemical treatment, $70,000, and incinerator, $40,000. W. Dunbar, town engr.

Ill., Glenwood—City plans sewage treatment plant for Glenwood Manual Training School. Greeley & Hansen, 6 North Michigan Ave., Chicago, Ill., engrs.

†**Ill., Great Lakes**—Navy Dpt. plans improving sewage disposal plant, at U. S. Naval Training Station.

Mass., Boston—Commonwealth of Massachusetts, Metropolitan Dist. Comn., W. E. Whittaker, secy., 20 Somerset St., cancelled bids to have been opened Apr. 16, constructing Sect. 115 of North Metropolitan Relief Sewer, in Winchester, Woburn and Stoneham, incl. 14,730 lin.ft. concrete sewer. P.W.A. project. New bids to be called later. Noted Apr. 7, C. D.—Apr. 9, E. N.-R.

Mass., Hadley—Town, F. H. Pelissier, clk., Town Hall, plans rebuilding sewerage system, damaged by flood. $100,000. Engineer not appointed.

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★**Mich., Lansing** — City retained Shoecraft, Drury & McNamee, engrs., Ann Arbor, to prepare plans and specification for sewage and garbage disposal plant, pumping station, pressure main. $900,000. Application for P.W.A. grant pending.

N. C., Lincolnton—See "Waterworks."

Pa., Altoona — City and Logan Twp. plan twin line 30 in. sewers in 18th St. area. $225,000. **Maturity soon.** May seek federal funds to finance. H. J. Baum, city engr.

★**Tex., El Paso**—City, c/o R. E. Sherman, mayor, sanitary sewers. $500,000. P.W.A. allotment rescinded. Noted Oct. 7, C. D.—Oct. 10, E. N.-R.

Tex., Hedley—City, E. L. Thompson, mayor, sanitary sewerage system. $28,500 P.W.A. allotment rescinded. W. D. Howren, Amarillo, engr. Noted Nov. 26, C. D.—Oct. 31, E. N.-R.

Que., Montreal — Municipality appropriated $90,000 to complete part of the Decarie Ave. Sewer.

BIDS ASKED

Conn., Middletown—See "Contracts Awarded."

Conn., West Hartford (br. Hartford)—Apr. 27, by Town, constructing 1,280 ft. 10 in. and 830 ft. 8 in. tile sewer, New Park Ave.

Ga., Atlanta—Apr. 28, by Robert Co., engrs., c/o City Office, Atlanta, constructing South River Sewage Plant, incl. one 6 m.g.p.d. sewage treatment plant, one story, 40x50 ft., central building, 2 secondary clarifiers, 12x60 ft., four trickling filters, 173 ft. diam., two final clarifiers, 60 ft. diam., two digestors, 55 ft. diam., one dosing tank, sludge beds, pump house, miscellaneous piping, meters, pumps, boilers, for City. $25,000.

Ill., Belleville—Apr. 28, by City, G. Rennsnider, mayor, constructing sewage disposal plant. P.W.A. project. Consoer, Townsend & Quinlan, 203 West Wacker Dr., Chicago, engrs. Noted Mar. 31, C. D.—Apr. 9, E. N.-R.

Md., Frederick—Apr. 29, by City, sewers, screen chamber, channels, clarifying sludge tanks, control building, incinerator, brick stack, roads, grading, etc., $160,000. P.W.A. project. Whitman, Requardt & Smith, West Biddle and Charles Sts., Baltimore, engrs.

Mich., Gaylord—Apr. 28, by State Dpt. Health, furnishing labor and material for sewerage and water system for state tuberculosis sanitarium, incl. 4,800 ft. storm sewer, manholes, etc., vitr. or concrete pipe, 1,900 ft. 4 and 6 in. c.i. watermains with specials, etc. $25,000. P.W.A. project. Michigan Dpt. Health, 607 State Office Bldg., Lansing, engr. Noted Apr. 6, C. D.

Mich., Howell—May 5, by H. H. Heeg, city clk., constructing sewage treatment plant of 7 principal structures, incl. combined pumping station and service building, circular primary tank, circular final settling tank, also diversion chamber, sludge bed substructure, piping, electrical work, landscaping, laboratory equipment. Francis Eng. Co., 303 Eddy Bldg., Saginaw, engrs.

Mich., Quincy—May 12, by Anna Wright, village clk., furnishing, installing sewage treatment works, incl. diversion and screen chamber, primary tank, pump rooms digestion tank, open sludge drying bed, sludge collector, pump, piping and appurtenances. A. H. Smith & Niles Co., engrs.

Mich., Sparta—May 4, by G. G. Dahlin, village clk., furnishing automatic syphons, distributor, mechanism, gates, valves and c.i. pipe for pre-treatment of milk wastes at sewage treatment plant. $25,000. Williams & Works, County Bldg., Grand Rapids, engrs.

N. J., New Providence—Apr. 29, by City, Contrs. A1, A2, A3, A4, for sewerage system. Bids Mar. 31 rejected. Clyde Potts, 30 Church St., New York, engr. Noted Mar. 19, E. N.-R.

N. Y., Poughkeepsie — See "Contracts Awarded."

N. Y., Skaneateles—See "Contracts Awarded."

O., Columbus—Apr. 28 (extended date), by P. W. Maetzel, engr., City Hall, constructing 6,000 ft. storm sewer in Oakland Park Dist., P.W.A. Contr. 67, Part 2, for City. $85,500. Noted Mar. 31, C. D.—Apr. 2, E. N.-R.

★**O., Columbus**—May 5, by P. W. Maetzel, engr., City Hall, installing and constructing sludge digestion tanks and control house, Columbus Sewage Treatment Project Contr. 15, incl. 1,900,000 lb. reinforcement bars, 55,000 lb. iron castings, 45,000 lb. steel and wrought iron, etc., for City. $440,838. W.P.A. project.

Wis., Appleton—May 14, by City, constructing industrial sewer connections. P.W.A. project. Greeley & Hansen, 6 North Michigan Ave., Chicago, Ill., engrs.

Man., Winnipeg — May 13, by Chairman Greater Winnipeg Sanitary Dist. Bd., supply, installation and erection of vacuum filter equipment and accessories.

CONTRACTS AWARDED

Calif., Los Angeles—Bd. P. Wks., installing 2 duplicate sewage pumping units in plant at

†*Federal Government*

sewerage, etc. (Continued)

San Pedro, incl. all connecting piping, mechanical and electrical appurtenances. **P.W.A.** project 5633, Unit 4-B, to Byron Jackson Co., 2150 East Slauson Ave., $3,286. Bids Jan. 2, awarded Apr. 8. Noted Jan. 10, C. D.

Conn., Hartford—Bd. Contr. & Supply., Metropolitan Dist., constructing 7,000 ft. 8 and 10 in. tile sewers. Stony Brook Sewer provides for sewers in Wilton, Park, Plymouth, Harvey, Hillcrest, Laurel, Ludlow Rds., Sts. and Aves., Windsor, to Arborio Road Constr. Co., 2 Wolcott Ave., Wilson, $30,978. Est. $30,000. **P.W.A.** Bids Mar. 31, awarded Apr. 8. Noted Feb. 25, C. D.—Feb. 27, E. N.-R., under "Windsor."

Conn., Middletown—City, constructing sanitary sewers in West St. from Wash. St. to Mary E. Way property and Burbridge Ave. from Maple to Walnut Sts. W.P.A. labor. Est. $24,000. R. H. Myichreest, Bd. P. Wks., engr.

Conn., New Britain — City, sewage disposal plant, Christian Lane, incl. dosing, mixing and settling tanks, etc., to F. H. McGraw & Co., 51 East 42nd St., New York, $337,183. Est. $424,875. **P.W.A.** Bids Apr. 6, awarded Apr. 10. Noted Apr. 8, C. D.—Mar. 19, E. N.-R.

Ga., Atlanta—City, equipment for Plant 2, disposal plant, to Chicago Pump Co., 2336 West Walfran St., Chicago, Ill., $3,790***equipment for Plant 3, to Chain Belt Co., 1600 West Bruce St., Milwaukee, Wis., $5,200***equipment for Plant 3, to Pacific Flush Tank Co., 4241 North Ravenswood Ave., Chicago, Ill., $24,207*** equipment for Plant 4, to Link Belt Co., 300 West Pershing Rd., Chicago, Ill., $14,420. Grand total $47,707. **P.W.A.** Noted Mar. 26, C. D. —Apr. 2, E. N.-R.

Kan., Greensburg—City, c/o Clerk, complete sewage disposal plant, to J. F. Wayland Bridge Co., Washington, $30,959. Est. $80,000. **P.W.A.** Bids Apr. 7. Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

★ **La., New Orleans**—Sewerage & Water Bd., to J. Riess, Carondelet Bldg., constructing Sewage Pumping Station 21, Memphis St., Contr. 211-S, $16,775; gravity sewers and discharge mains, 33 in. sub-main and smaller tributary sewers in area bounded by Harrison Ave., Robert E. Lee Blvd. and New Basin Canal and Orleans Ave., and installing 24 in. c.i. main, Memphis St., Contr. 119-S, $224,334; furnishing, installing sewers in Algiers, Contr. 116-S, $206,466***to J. A. Saunee, 1903 Gallier St., installing underground power cable for Pumping Station 21, Contr. 217-S, $8,544*** to Dibert, Bancroft & Ross Co., Ltd., 3400 Tulane St., furnishing pumps, Project 212-S, $5,726***to Crocker Wheeler Electric Mfg. Co., Ampere, N. J., motors, swtichboards, transformers, etc., Contr. 213-S, $18,674***to U. S. Pipe & Fdry. Co., Webb-Crawford Bldg., Birmingham, Ala., furnishing 24 in. c.i. sewer main to be installed in Memphis St., Contr. 118-S, $31,564***to National Cast Iron Pipe Co., Tarrant St., Birmingham, Ala., c.i. pipe and fittings for Pumping Station 21, Contr. 214-S, $2,338 ***to Cahn Bros. & Ryder, Inc., 900 South Peters St., valves, Contr. 215-S, $1,495***to Esco, Inc., furnishing underground power cable, Contr. 216-S, $11,453. Grand total $527,369. **P.W.A.** Bids Apr. 2. Noted Apr. 10, C. D.—Feb. 13 and 20, E. N.-R.

Mass., Haverhill—See "Streets and Roads."

Mass., Springfield—See "Streets and Roads."

Minn., St. James—City, constructing sewage disposal plant, to Barnett & Record, 700 Flour Exch. Bldg., Minneapolis, $57,885. **P.W.A.** Bids Mar. 26. Noted Apr. 9, C. D.—Mar. 5, E. N.-R.

Mo., Pilot Grove—City, constructing sewage disposal plant, to P. P. Young, St. Joseph. Est. $26,000. **P.W.A.** W. B. Rollins & Co., 339 Railway Exchange Bldg., Kansas City, engrs.

Mo., St. Louis—Bd. P. Serv., City Hall, furnishing, installing 2 green garbage conveyor units complete with motors and controls for Dpt. Streets & Sewers, to Essmeller Mill Furnishing Co., 1220 South 8'h St., $5,350. Bids Mar. 24. Noted Apr. 2, C. D.—Mar. 26, E. N.-R.

N. Y., Herkimer—Village, constructing sewage disposal plant, to Underpinning & Foundation Co., 155 East 44th St., New York, $71,484. Award subject to **P.W.A.** approval. Bids Apr. 6. Noted Apr. 9, C. D.—Mar. 19, E. N.-R.

N. Y., Poughkeepsie—City, constructing sanitary sewers in various streets, relief labor, $313,657. **W.P.A.** D. Jordon, High School, Main St., White Plains, procurement officer W.P.A. will purchase materials.

N. Y., Schenectady—City, Bd. Contr. & Supply, City Hall, constructing sewer from Nott Terrace High School to Seward Pl., to Veeder Contg. Co., 425 Peek St.

N. Y., Skaneateles—Village, constructing sanitary sewer, new manholes, in Onondaga St. near Earl St., relief labor. Est. about $25,000. **W.P.A.** G. L. Noble, Old Post Office Bldg., Syracuse, procurement officer, W.P.A. will purchase materials.

N. C., Greensboro—City, constructing sanitary sewer outfall, to A. G. Pinkston & Co., Norfolk, Va., $235,400. **P.W.A.** C. W. Smedburg, Greensboro, engr. Bids Mar. 17. Noted Mar. 26, C. D.—Apr. 2, E. N.-R.

O., Columbus—P. W. Maetzel, city engr., City Hall, constructing sanitary and storm sewers, Bliss Run Dist. Contr. 58, Part 4, to General Constr. Co., 337 South High St., Columbus, $59,707. **P.W.A.** Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Pa., Birdsboro—See "Streets and Roads."

Pa., Lock Haven—See "Waterworks."

Wis., La Crosse—City, constructing intercepting sewer Contr. 2, to T. E. Wodley, La Crosse, $122,742. **P.W.A.** Noted Apr. 10, C. D.—Apr. 16, E. N.-R.

Wis., Sheboygan — City, constructing River Crossing, Contr. E, to L. G. Arnold, Inc., Eau Claire, $122,723. **P.W.A.** Noted Apr. 17, C. D. —Apr. 23, E. N.-R.

Wis., Wauwatosa — City, constructing storm sewer in Martha Washington Dr., to B. Wogikoski, 3626 North 3rd St., Milwaukee, $28,641. **P.W.A.** Noted Apr. 10, C. D.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Iowa—State Hy. Comn., Ames, soon takes bids constructing one 60 x 24 ft. I-beam bridge, with two 5 ft. sidewalks on Primary Rd. 93, Sumner, Bremer Co., incl. 440 cu.yd. Class 1 and 220 cu. yd. Class 2 excav. F. R. White, ch. engr.

Iowa—State Hy. Comn., Ames, soon takes bids constructing 54x24 ft. continuous I-beam bridge, 1 rein.-con. arch and 1 rein.-con. pipe culverts on secondary road, south of Fort Dodge, Webster Co., incl. 314 cu.yd. Class 1 excav.; 180x24 ft., 150x24 ft. and 150x24 ft. continuous I-beam bridges on Primary Rd. 83, between Marne and Walnut, Cass and Pottawattamie Counties; 195x24 ft. and one 195x24 ft. continuous I-beam bridges, secondary road, northeast of Albia at M. & St. L. R.R. and C. B. & Q. R.R., Monroe Co.; one 312x24 ft. cantilever through plate girder overhead crossing structure and 1 rein.-con. pipe culvert on U. S. Rd. 63, M. & St. L. R.R. crossing north of Oskaloosa, Mahaska Co., incl. 1045 cu.yd. Class 1 excav. F. R. White, ch. engr.

Iowa — State Hy. Comn., Ames, soon takes bids constructing one 116x24 ft. continuous I-beam bridge, incl. 275 cu.yd. excav.; and one 120x20 ft. continuous I-beam bridge, 90 cu. yd. Class 1 and 85 cu.yd. Class 2 excav. on secondary road, west of Richland at C. M. & St. L. R.R., Keokuk Co.; 1 concrete box culvert extension and 1 concrete pipe culvert on secondary road northwest of Doon, at G. N. R.R., Lyon Co., 200 cu.yd. Class 1 excav.; 7 rein.-con. box culverts on secondary road between Waukon Junction and Harpers Ferry, Allamakee Co., 600 cu.yd. Class 1 excav.; 2 rein.-con. pipe and 4 rein.-con. box culverts on secondary road, east of Backbone State Park, Delaware Co., 281 cu.yd. Class 1 excav.; 1 rein.-con. box and 1 rein.-con. pipe culverts on secondary road at C. B. & Q. R.R. crossing north of Hawthorne, Montgomery Co., 305 cu. yd. Class 1 excav. F. R. White, state hy. engr.

Iowa—State Hy. Comn., Ames, soon takes bids constructing 48x24 ft. and two 41x24 ft. cantilever I-beam spans, incl. 265 cu.yd. Class 1 excav.; one 125x24 ft. continuous I-beam bridge, 190 cu.yd. Class 1, 290 cu.yd. Class 2 and 4,620 cu.yd. channel excav. on U. S. Rd. 169, at C. M. St. P. & P. R.R., west of Bouton, Dallas Co. F. R. White, ch. engr.

Ia., Sibley—Osceola Co., F. W. Folkers, aud., plans bridges and culverts, $25,860; graveling 28 mi. road, and grading 28.8 mi. secondary roads during 1936-37. E. Winkel, co. engr.

Kentucky—State Hy. Comn., Frankfort, rescinded contracts for river piers, FA 226-B-1-B, approaches FA 226-B-2-B, and steel arch river span FA 226-B-3-B, for bridge over Kentucky River, Frankfort, Franklin Co.; bridge over Licking River, Cynthiana, S.P. 893-AB, Harrison Co. Bids Dec. 6. Noted Dec. 18, C.D.—Dec. 26, E. N.-R., under "Streets and Roads" and "Bridges and Grade Crossings," under "Contracts Awarded."

Mass., Brookfield—Town, J. J. Morrill, supt. Streets, Town Hall, A. W. Mitchell, chn. Bd. Selectmen, plans single span, rein.-con., steel bridge, $30,000. P.W.A. project.

Mass., Lawrence—Commonwealth of Massachusetts, Dpt. P. Wks., 100 Nashua St., Boston, plans grade crossing, through plate girder bridge with wrought iron deck plates of about 122 ft. span over Andover St., and about 1,360 sq.yd. granite block pavement on concrete founds., Andover St. To exceed $75,000. W. F. Callahan, comr. Dpt. P. Wks., G. H. Delano, ch. engr., both 100 Nashua St., Boston.

Mass., Webster—Town, J. A. Patenaude, chn. Bd. Selectmen, plans rebuilding 50 ft. span steel truss bridge on stone abutments, Putnam and School Sts., recently destroyed by flood. Est. $25,000. B. A. Wakefield, town engr.

Montana—Northern Pacific Ry., B. Blum, ch. engr., 176 East 5th St., St. Paul, Minn., plans replacing bridge over Bitter Root River, 4 mi. south of Missoula and 3 bridges between Helena and Bozeman.

†*Federal Government*

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40 TO 1

This is the relative space required for drying sludge on sand filter beds in a city of 100,000 population, contrasted with that occupied by the Nichols Herreshoff Incinerator to assure complete disposal. The sludge bed area is approximately 100,000 sq. ft. and the incinerator area about 2,500 sq. ft.—in the ratio of 40 to 1.

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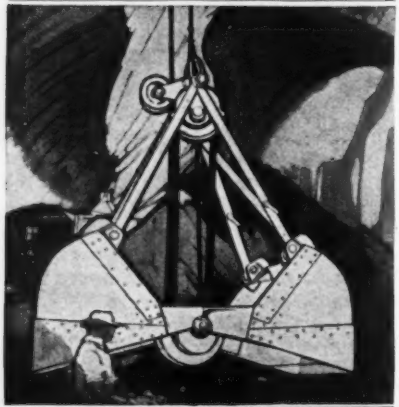

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Bridges, etc. (Continued)

New Jersey—Delaware River Joint Toll Bridge Comn. of New Jersey and Pennsylvania, State House, Trenton, has been granted permission through a House bill at Washington, to build a toll bridge across Delaware River near Delaware Water Gap, Pa., bill sent to the Senate. Plans and cost not ready. L. Focht, State House, engr.

New Jersey — State Hy. Dpt., Trenton, rejected bids Apr. 6, grade crossing elimination near Towaco, Morris Co. Will readvertise. Noted Apr. 9, C. D.—Apr. 16, E. N.-R.

★ **North Dakota**—State Dpt. Hys., Bismarck, soon takes bids constructing 262 ft. rein.-con. and I-beam overhead grade separation structure over Great Northern R.R. tracks on U. S. Rd. 2, at Churches Ferry, WPGH 27, Benson Co., incl. 352,047 cu.yd. unclassified excav.; relocating, grading 5.1 mi. U. S. Rd. 281, north of Carrington, WPGH 2, Foster Co., for eliminating grade crossing, 123,658 cu.yd. excav.; relocating and eliminating grade crossings on 4 mi. U. S. Rd. 281 between Carrington and New Rockford, WPGH 92, Foster Co., 89,534 cu.yd. unclassified excav.; structures and grading for eliminating grade crossings on road between Cando and Maza, WPGH 130, Towner Co., 215,217 cu.yd. excav.; structures, graveling 6.143 mi. for relocating grade crossings north and south of Inkster, WPGH 131A, Grand Forks Co., 95,804 cu.yd. excav.; constructing 113 ft. rein.-con. I-beam overhead grade separation and approaches over Midland Continental tracks on U. S. Rd. 10, near Spiritwood, WPGH 55, Stutsman Co., 133,792 cu.yd. unclassified excav.; 136 ft. rein.-con. and I-beam overhead grade separation structure and approaches over Grand Northern Ry. Co. tracks on S.H. 3, at Selz, WPGH 48C, Pierce Co., 63,778 cu.yd. unclassified excav.; underpass separation structure under Northern Pacific R.R. tracks at Dickinson, WPGM 14C, Stark Co.; underpass separation structure under Northern Pacific R.R. tracks west of West Fargo, WPGS 605, Cass Co.; removing center pier of underpass structure on U. S. 10, near Antelope, WPGH 260F, Stark Co.; constructing 172 ft. rein.-con. overhead grade crossing separation structure and approaches over main line Great Northern Ry. at Pillsbury, WPGH 233C, Barnes Co., 200 cu.yd. structural and 45,812 cu.yd. unclassified excav.; paving underpass structure under Great Northern Ry. Co. tracks at Stanley, WPGM 118AB, Mountrail Co.; constructing underpass structure at Stanley, WPGM 118C, Mountrail Co., 12,974 cu.yd. unclassified excav.; removing center pier of underpass at Des Lacs, WPGH 83C, Ward Co.; constructing 153 ft. rein.-con. and I-beam structures and approaches, sgutheast of Glenfield, WPGH 295A, Foster Co., 66,546 cu.yd. unclassified excav.; 205 ft. rein.-con. I-beam overhead structure and approaches at Casselton, WPGH 137EF, Cass Co., 11,891 cu.yd. excav.; 137 ft. rein.-con. and I-beam overhead structure and approaches at Hannaford, WPGH 109C, Griggs Co., 185 cu.yd. structural excav.; underpass structure under Minneapolis, St. Paul & Sault Ste. Marie tracks, at Harvey, WPGM 631, Wells Co., 1,549 cu.yd. structural excav.; underpass structure under Minneapolis, St. Paul & Sault Ste. Marie Ry. tracks at Velva, WPGM 632, McHenry Co., 1,020 cu.yd. structural excav.; 173 ft. rein.-con. and I-beam overhead grade separation over Minneapolis, St. Paul & Sault Ste. Marie Ry. tracks at Carrington, WPGM 151, Foster Co., 644 cu.yd. structural excav. $1,171,100.

New York—Dpt. P. Wks., State Office Bldg., Albany, making plans constructing concrete bridge over Susquehanna River at Windsor, to exceed $100,000; underpass and relocating Binghamton-Albany Rd., at Harpursville, both $200,000, Broome Co. T. F. Farrell, Albany, state hy. engr. on 1st project. F. W. Donovan, dist. engr., New York State Dpt. P. Wks., Binghamton, preparing plans for both projects.

N. Y., Remsen—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, petition Public Service Comn. for permission to relocate main tracks entering village and eliminate grade crossing at Pine, Prospect and Depot Sts. To exceed $23,000.

O., Cleveland—Bd. Comrs., Cuyahoga Co., made plans widening 20 ft. steel bridge, Lee Rd. and Moreland Blvd. $18,500. J. O. McWilliams, Standard Bldg., engr.

★ **Pa., Mount Pocono**—Delaware, Lackawanna & Western R.R. Co., G. A. Phillips, ch. engr., Hoboken, N. J., plans elimination of grade crossing at Mt. Pocono R.R. station, moving right-of-way 500 ft. to west and constructing underpass. Est. $450,000. Government aid project. Plans approved by Federal Government. Will seek sanction of Public Service Comn.

★ **Texas**—State Hy. Comn., H. Hines, chn., Austin, soon takes bids constructing M. K and T. and So. Pacific R.R. underpasses, in San Antonio, W.P.G.M. 264E, Bexar Co., $275,000; constructing Southern Pacific R.R. underpasses, Front St. and S St., Yoakum, W.P.G.M. 852A, De Witt Co., $200,000; Texas & Pacific and F. W. and R. G. R.R. overpass and concrete base with bituminous filled brick paving Daggett St., Fort Worth, W.P.G.M. 848-A, Tarrant Co. New P.W.A. project.

Vermont—State Hy. Dpt., Montpelier, making plans repairing west abutment steel, rein.-con. bridge over Connecticut River. $20,000-$25,000. H. E. Sargent, ch. engr.

Vermont—State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier, received no bids Apr. 10, for concrete, steel bridge with gravel approaches over North Branch River on 0.2 mi. Montpelier-Elmore Rd., Project WPSO 203-A, Worcester. Noted Apr. 7, C.D.

Vermont—State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier, plans repairs to abutments and steel spans of bridge over Connecticut River, Westminster, damaged by flood. Est. $25,000.

Vt., Springfield—Town, R. M. Wilcomb, town clk., Town Hall, plans rebuilding 70 ft. span concrete steel bridge over Black River, destroyed by flood. To exceed $20,000.

Que., Bromptonville—Canadian National R.R., Montreal, prepares plans bridge over tracks, $46,900.

Que., Bromptonville—Municipality plans, by L. D. Lachapelle, Dpt. P. Wks., Quebec City, constructing viaduct. $100,000.

BIDS ASKED

Ariz., Winslow—May 1, by State Hy. Comn., Phoenix, constructing rein.-con. subway under A. T. and S. F. Ry. tracks on Winslow-Pine Hy., W.P.G.M. 107 A.F.E. 621, incl. 14,400 cu.yd. structural excav. T. S. O'Connell, state hy. engr.

Calif., Auburn—May 5, by Supervs. Placer Co., constructing 85 ft. steel span bridge on steel pile founds., with wood deck over Coon Creek, 6 mi. north of Lincoln; 70 ft. long steel span bridge on steel piles, foundations with concrete floors over Dry Creek, Douglas St., near Roseville. W. E. Emmett, Sharon Bldg., San Francisco, engr.

Indiana — Apr. 28, by State Hy. Comn., Indianapolis, constructing 252 ft. rein.-con. girder bridge over C. I. & L. Ry., Putnamville, Putnam Co.; 42 ft. and 32 ft. steel I-beam bridges over Pennsylvania R.R., Jeffersonville, Clark Co.; 140 ft. rein.-con. girder bridge over Pennsylvania R.R., Plainfield, Hendricks Co.; 200 ft. steel beam over Blue River, near Knightstown, Rush Co.; 100 ft., 22 ft. and 140 ft. steel bridges on creosoted piles over Patoka River, Backwater Creek, Flat Creek, Pikeville and rural overflow districts, Pike Co.; 30 ft. rein.-con. arch bridge over Irishman Run, Zionsville, Boone Co.; repairing 127 ft. steel truss bridge over Salamonie River, and 90 ft. steel bridge on creosote piling over Rock Creek, Montpelier and rural district, Blackford and Wells Counties; Bridge 1849 over Shirley Creek, bridge over Milford Branch, 56 ft. bridge over Barnetts Ditch, rein.-con. bridge over Barnetts Ditch, and 50 ft. bridge over Eel River, near Danville and Lizton, Hendricks Co.; 28 ft. rein.-con. girder and 45 ft. steel beam bridge over Grassy Branch and branch of Little Eel River, near Lebannon; 363 ft. steel bridge and grading, paving 0.47 mi. over C. & O. and C. & R. E. Rys., Highland, Lake Co.; 185 ft. rein.-con. girder bridge on 0.35 mi. grading and paving over New York Central R.R., Highland, Lake Co.; 215 ft. rein.-con. girder and 202 ft. steel beam on creosoted pile bridge on 0.577 mi. over C. S. S. & S. B. R.R. and Grand Calumet River, Gary, Lake Co.; 33 ft. steel beam underpass under New York Central R.R., Otis, Laporte Co.; 75 ft. and 30 ft. steel and creosoted steel piling bridge over West Fork and East Fork Thurman Creek, Rural Districts, Vigo Co. M. R. Keefe, state hy. engr.

Iowa—Apr. 28, by State Hy. Comn., Ames, constructing 1 corrugated metal pipe, 12 rein.-con. pipe and 22 rein.-con. box culverts on Primary Rd. 154, WPMS-WPSS-611-AB, Fayette Co., incl. 917 cu.yd. Class 1 excav.; three 32x24 ft. I-beam span bridge, 60 cu.yd. Class 1 and 190 cu.yd. Class 2 excav. on same road; 5 rein.-con. pipe and 5 rein.-con. box culverts on Primary Rd. 154, out of Arlington, WPGS-WPGM-611-DE, Fayette Co., 200 cu.yd. Class 1 excav.; one 150x24 ft. rein.-con. arch bridge on Primary Rd. 175, west of Ellsworth, Hamilton Co., 600 cu.yd. Class 1 and 182 cu.yd. Class 2 excav.; one 150x24 ft. high truss bridge with seven 37x24 ft. I-beam spans, constructing and paving approach fills on Primary Rd. 2, West Rose Hill, WPH-70-A, Mahaska Co., 387 cu. yd. Class 1 and 188 cu.yd. Class 2 excav.; moving and re-erecting one 150x18 ft. high approach spans and fifteen 20x18 ft. I-beam rein.-con. box culvert on secondary road, south of Rose Hill, Mahaska Co., 230 cu.yd. Class 1 and 385 cu.yd. Class 2 excav.; one 50x24 ft. I-beam bridge on secondary road between Eddyville and Ottumwa, Wapello Co., 260 cu.yd. Class 1 and 172 cu.yd. Class 2 excav.; two 40x24 ft. I-beam span bridge on secondary road between Eddyville and Ottumwa, WPSO-598, Wapello Co., 470 cu.yd. Class 1 and 281 cu.yd. Class 2 excav.; one 122x24 ft. continuous I-beam bridge, 180 cu.yd. Class 1, 90 cu.yd. Class2, 74 cu.yd. channel and 18 cu.yd. rock excav.; one 40x24 ft. I-beam bridge and two 32x24 ft. I-beam span bridge, 420 cu.yd. Class 1, 244 cu.yd. Class 2 and 1 cu.yd. rock excav. on same road. F. R. White, Ames, ch. engr.

Md., Baltimore—Apr. 29, by Bd. Awards, reinforcing and redecking Belvidere Ave. Bridge.

Pennsylvania—See "Streets and Roads."

Wisconsin—See "Streets and Roads."

†*Federal Government*

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Bridges, etc. (Continued)

CONTRACTS AWARDED

Arkansas—See "Streets and Roads."

Arkansas—State Hy. Dpt., Little Rock, constructing 427 lin. ft. overpass over M. O. P. Ry., to Luten Bridge Co., Natl. Standard Bldg., Little Rock, $42,408 Est. $60,000. Noted Apr. 7. C. D.—Apr. 9, E. N.-R., under "Streets and Roads."

Calif., Santa Cruz—Supervs. Santa Cruz Co., constructing 12 ft. culvert, 98 ft. long in Eureka Canyon, replacing bridge over Corralitos Creek, Santa Cruz Co., to L. C. Karstedt, 16 Wall St., Watsonville, $12,285. Bids Apr. 7, awarded Apr. 12. Noted Apr. 14, C. D.—Apr. 16, E. N.-R.

Indiana—State Hy. Comn., Indianapolis, constructing 30 ft. rein.-con. arch and 16 ft. rein.-con. slab bridges in New Albany, Floyd Co., to Steinkamp Co., Batesville, $27,084. Est. $34,121. Bids Feb. 4. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

Maine—Maine Central R.R., 222 St. John St., Portland, W. J. Backes, ch. engr., Portland, raising and restoring 6 span 877 ft. Maine Central R.R. bridge over Androscoggin River, between Brunswick and Topsham, swept from its piers during recent flood, to Merritt, Chapman & Scott Co., 292 Pequot Ave., New London, Conn. Est. about $150,000. Noted Apr. 13, C. D.—Apr. 16, E. N.-R., under "Brunswick, Me."

Michigan — State Hy. Dpt., Lansing, constructing 2 rein.-con. gravity abutments, one 45 ft. span W.P.S.O.—B 1 of 45-4-21 C-1, Leelanau Co., to Johnson & Greene, Ann Arbor, $10,689***2 rein.con. abutments on treated pile found., Antonagon Co., to C. Gosner & Co., Detroit, $68,870***preparing soil, furnishing, planting trees, shrubs 0.87 mi. St. Clair Co., to Coryell Nursery Co., Birmingham, $48,657. Grand total $128,216. Bids Mar. 26. Noted Mar. 16, C. D.—Mar. 19, E. N.-R.

Minnesota—State Hy. Dpt., St. Paul, constructing 127 ft. Bridge 5402. WPGM 275-D, State Project 32-32-29-3, and grading 0.344 mi. road in Red Lake Falls, to McCree & Co., 918 New York Bldg., St. Paul, and to Widell Co., Mankato, $32,990. Bids Mar. 27. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

Missouri—State Hy. Comn., Jefferson City, constructing four 30 ft. rein.-con. deck girder span bridge in Schuyler Co., to Simmons & German and L. W. Spengler Constr. Co., LaPlata, $14,979***two 50 ft. I-beam span and one 180 ft. steel truss span bridge in Vernon Co., to Davis Constr. Co., Boonville***three 31 ft. I-beam span bridge, DeKalb Co., to Ackely Bros. Co., Kansas City***six 40 ft. rein.-con. deck girder and 150 ft. steel truss span bridge, Audrain Co., to C. H. Atkinson Paving Co., Chillicothe. Bids Mar. 13. Noted Mar. 18, C. D.—Mar. 5, E. N.-R.

Nevada—State Hy. Comn., Carson City, constructing bridge and overpass in Humboldt Co., to Dodge Constr. Co., Fallon, $67,845 and $55,670 respectively. Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

New Jersey—State Hy. Comn., Trenton, constructing bridge over Pennsylvania R.R. at Kinkora, to F. H. Clement & Co., Bethlehem, Pa., $87,345. P.W.A. Noted Apr. 15, C. D.—Apr. 23, E. N.-R.

New York—Triborough Bridge Authority, 111 8th Ave., New York, paving marginal roadways 19th to Boody Sts., Queens connection Triborough Bridge, connecting Manhattan, Brooklyn and Queens Boros., Contr. 67, to W. P. MacDonald Constr. Co., Lawrence St., Flushing, $431,824. P.W.A. Bids Mar. 26. Noted Mar. 27, C. D.—Mar. 19, E. N.-R.

N. Y., New York—Henry Hudson Parkway Authority, Arsenal Bldg., Central Park, furnishing, delivering toll equipment for Henry Hudson Parkway, to Taller & Cooper, 103 Lafayette St., New York, $13,160. Bids Mar. 26. Noted Mar. 27, C. D.—Mar. 19, E. N.-R.

Ohio—See "Streets and Roads."

Oklahoma—State Hy. Dpt., Oklahoma City, constructing 3 span 110 ft. bridge in Nowata Co., to Ninus & Frost, Hydro, $14,229 est. $16,302***52 ft. bridge in Tillman Co., to Capitol Steel & Iron Co., 1710 South Agnew St., Oklahoma City, $2,453 est. $2,320***5 span 205 ft. bridge in Nowata Co., to Moran & Buckner, Muskogee, $49,193 est. $53,703. Grand total $65,875. Bids Apr. 7. Noted Mar. 31, C. D.

Pennsylvania—See "Streets and Roads."

Pennsylvania—At office W. W. Van Dyke, secy. Hys., Harrisburg, repairing existing steel bridge, constructing rein.-con. pavement, etc., 1.185 ft. Route 639, Sect. 10, Allegheny and Westmoreland Counties, to Farris Eng. Co., Empire Bldg., Pittsburgh, $28,841***pony truss bridge, dual type pavement, etc. 0.77 mi. Route 3, Sect. 2, Montour Twp., Bloomsburg, Columbia Co., to Jacob Banks Constr. Co., 307 Meyer Bldg., Wilkes-Barre, $99,444. Bids Mar. 26. Noted Apr. 2, C. D.—Mar 5, E. N.-R.

Utah—See "Streets and Roads."

Virginia—Dpt. Hys., Richmond, constructing O.H. Crossing Southern R.R. and approaches, Pittsylvania Co., to Haymes Constr. Co., Chatham, $21,947***bridge over Thorofare Creek, New Kent Co., and bridge and approaches Mattaponi, King and Queen and King William Counties, to Carpenter Constr. Co., Norfolk, $8,304 and $75,411 respectively***O.H. Crossing, 0.29 mi. and 0.27 mi. Amherst Co., to A. N. Campbell & Co., Lynchburg, $44,290***2 bridges 1.5 mi. and 0.5 mi. Northumberland Co., to Virginia Constr. Co., Fredericksburg, $18,130. Grand total $168,082. Bids Apr. 9. Noted Apr. 15, C. D.—Apr. 23, E. N.-R.

Wisconsin—See "Streets and Roads."

STREETS AND ROADS

BIDS ASKED

Arizona—May 5, by State Hy. Comn., Phoenix, grading, draining 3.9 mi. Showlow-Concho Hy. WPSO 104-A, Schedule 3, A.F.E. 609, incl. 8,000 cu. yd. roadway excav. T. S. O'Connell, state hy. engr.

Arizona—May 5, by State Hy. Comn., Phoenix, grading, draining 10.7 mi. Globe-Showlow Hy. FLH 6-A, Unit 3, Navajo Co., incl. 107,000 cu. yd. roadway and 5,700 cu. yd. drainage excav. T. S. O'Connell, state hy. engr.

Connecticut—See "Contracts Awarded."

Florida—Apr. 30, by State Road Dpt., Tallahassee, bituminous surface treatment 8.921 mi. Rd. 81, between Labanon and Marion Co. line, Federal Aid Project 95C Reopened, Levy Co, J. H. Dowling, hy. engr.

Ill., Belleville—City soon takes bids concrete repaving 1 mi. South Illinois St. from Public Square to city limits. $65,000. J. G. Cooney, 3303 Rowland St., Belleville, engr.

Iowa—Apr. 28, by State Hy. Comn., Ames, grading 0.312 mi. secondary road west of Atkins, WPGS-633-A, Benton Co., incl. 52,056 cu.yd. excav.; 10,691 mi. Primary Rd. 154, from Primary Rd. 11 to Primary Rd. 10, WPSS-WPMS-611-B, 259,542 cu.yd. excav.; 2.316 mi. relocation Primary Rd. 154, out of Arlington, northwest, WPGS-611-DE, 70,438 cu.yd. excav., both Fayette Co.; grading, graveling 0.416 mi. secondary road, northwest of Solon at C. R. I. crossing Johnson Co., 46,110 cu.yd. excav.; 0.757 mi. secondary road, south of Rose Hill, Mahaska Co., 18,284 cu.yd. excav.; 0.369 mi. WPH-43-C, U. S. Rd. 18, west of Sheldon, Sioux Co., 5,700 cu.yd. excav.; 0.568 mi. U. S. Rd. 18, at C. M. St. P. and P. Ry. crossing, west of Sheldon, WPGH-43-D, Sioux Co., 63,289 cu.yd. excav.; graveling 7.946 mi. secondary road from Adair South, WPSO-655, Adair Co.; 11.284 mi. Primary Rd. 99, from Burlington North, WPH-572-A, Des Moines Co.; 10.691 mi. Primary Rd. between Primary Rd. 11 and Primary Rd. 10; 2.316 mi. Primary Rd. 154, out of Arlington, northwest, WPGS-WPGM-611-DE, both Fayette Co.; bituminous surfacing 3.199 mi. Primary Rd. 186, from Prescott South to U. S. Rd. 34, Adams Co.; 6.681 mi. Primary Rd. 49, from U. S. Rd. 34, south of Lenox, Adams and Taylor Counties; 0.571 mi. Primary Rd. 51, F.A.P. 170-CA, Allamakee Co.; 4.12 mi. Primary Rd. 42, from U. S. Rd. 275, east of Riverton; 3.367 mi. Primary Rd. 174, from Farragut North to Primary Rd. 3; 4.195 mi. Primary Rd. 145, from Thurman East to U. S. Rd. 275, all foregoing Fremont Co.; 7.829 mi. Primary Rd. 148, from Missouri State line northeast to Medford, Taylor Co. F. R. White, Ames, state hy. engr.

Ia., Grundy Center—Apr. 29, by Grundy Co., L. A. Meyer, aud., grading 17 mi. road, incl. 86,056 cu.yd. Class 2 and 87,500 cu.yd. Class 2a excav. J. W. Wiersma, co. engr.

Louisiana — Apr. 29, by State Hy. Comn., Baton Rouge, concrete paving 8.203 mi. Boutte-Bayou Des Allemands Hy., Route 2, Project 5400-B, F.A.P. 216-B and C, St. Charles Parish; grading, surfacing 4.128 mi. Jone's Bayou-Monterey Hy., Route 820, Project 880-A, W.P.S.O. 265, Catahoula Parish; 4.001 mi. Washington-Beggs Hy., Routes 5 and 27, Project 5853-B, F.A.P. 211-D and 143, reopened, Part 2, St. Landry Parish; 6.391 mi. Intersection Route 227-Intersection Route 115 Hy., Route 692, Project Bond FR 822 A-2, Lincoln Parish; 2.121 mi. Mount Olive-Liberty Hill Hy., Route 545, Project Bond FR 866-A, Bienville Parish; 3.939 mi. Winnsboro-South Hy., Routes 640 and 954, Project Bond FR 927-A, Franklin Parish; 5.968 mi. Chinchuba-Madisonville Hy., Routes 465 and 188, Project Bond FR 960-B, St. Tammany Parish; 2.234 mi. La Cour Spur-River Rd. Hy., Route C-1372, Bond FR 975-A, Pointe Coupee Parish; 2.599 mi. Natchitoches-Upper Dam Hy., Route C-1447, Project Bond FR 1171, Natchitoches Parish; 3.274 mi. Airline-Lake Shore Hy., Route C-1448, Bond FR 1172, St. Charles Parish; 1.1 mi. Rockdale-Elmwood Hy., Route C-1453, Project Bond FR 1177, De Soto Parish; 4 mi. Intersection Route 169, Buie's Place Hy., Route 643, Project Bond FR 1178, Franklin Parish; 7.8 mi. highways, Routes 571, C-1454 and C-1455, Project Bond FR 1179, Evangeline Parish. H. B. Henderlite, state hy. engr.

Louisiana—May 6, by State Hy. Comn., Baton Rouge, grading, gravel surfacing 6.029 mi. Intersection Route 37, Intersection Route 35 Hy. on Route 1223, Project 945-B-2, USWP 295, St. Helena Parish.

Maryland—Apr. 28, by State Roads Comn., Baltimore, macadam paving 1.62 mi. along

†Federal Government

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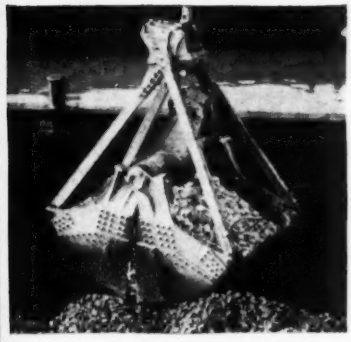
Construction Equipment



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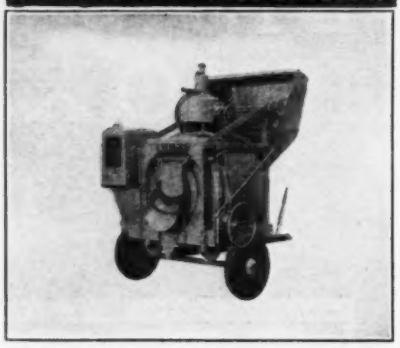

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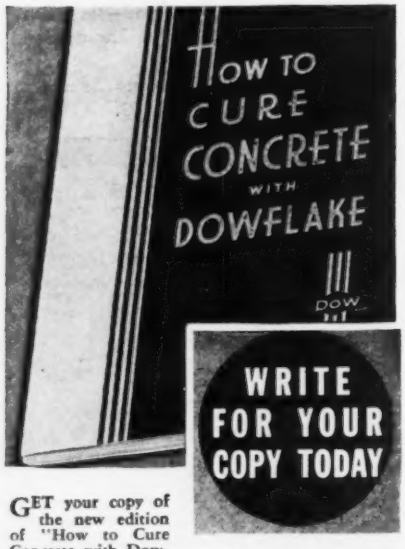

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Streets and Roads (Continued)

Smithburg, Foxville Rd. from end Contr. W166, at Washington Co. line to Foxville, Frederick Co.: concrete paving 1.16 mi. along Severn Odenton Rd. from Maryfield to Odenton, Anne Arundel Co.

Mass., Haverhill—See "Contracts Awarded."

Mass., Springfield—See "Contracts Awarded."

Mass., Webster—See "Contracts Awarded."

Nebraska—Apr. 30, by State Dpt. Roads & Irrigation, Lincoln, bituminous sand surfacing 6.1 mi. Alliance-Antioch Rd., Project 21, Div. 4, Sheridan Co., incl. 145,700 cu.yd. excav.; oiled surfacing on Wauenta-Hamlet Project 26, Div. I, Chase and Hayes Counties; 18 mi. Imperial-Waunetta Rd., Project 26, Divs. 2 and 95-B, Chase Co.: 5.7 mi. Harrison-Crawford Rd., Projects 45-C and 45-D, Sioux and Dawes Counties: 11.8 mi. Norfolk-Meadow Grove and Battle Creek North, Projects 139-B and 139-H, Project 733, Madison Co.; 4.4 mi. Nelgith-Oakdale Rd., Project 139-C, Div. 2, Antelope Co.: 8.9 mi. Seward-David City, Project 157-D, Seward Co.: 12.9 mi. Crawford-Chadron Rd., Projects 265-A, 265-C and 265-D, Dawes Co.; 12 mi. Plainview-Randolph Rd., Project 268-A, Pierce Co.: 9.7 mi. Osmond-Randolph Rd., Projects 268-B and 269-D, Cedar Co.; 14.1 mi. Alma-Holdredge Rd., Projects 308-B and 308-E, Harlan Co.: graveling 0.8 mi. McCook South Rd., Project 293-B, Red Willow Co.: 22.2 mi. Bassett-Taylor Rd., Project 141-K and Patrol 848, State Rd., Rock Co.; 3.3 mi. Albion-Spaulding Rd., Project 381-A, Boone Co.; 6 mi. Naper-Jamison Rd., Project 672-B, Boyd Co.; 5.4 mi. Table Rock-Lewiston Rd., Patrol 158, Pawnee Co.: 7 mi. Tobias-Western Rd., Patrol 165, Saline Co.: 8.9 mi. Arnold-Callaway Rd., Patrol 710; Custer Co.: 14.6 mi. Eli-Nensel Rd., Patrol 814, Cherry Co.: 6.2 mi. Bassett-Springview Rd., South Dakota State Line Rd., Patrol 832, Keya Pasha Co.: 11.2 mi. Ainsworth-Springview Rd., Patrol 836, State Rd., Keya Pasha and Brown Counties: 11.8 mi. Bassett-Springview Rd., Patrol 844, Rock and Keya Pasha Counties: grading, box culverts and headwalls, bituminous sand surfacing 9 mi. Gordon-Merriman Rd., Project 202-A, Cherry Co. A. C. Tilley, state engr.

New Hampshire—State Hy. Dpt., Concord, indefinitely postponed taking bids which were to have been opened Apr. 11, for improving hys. in Warner and Sutton, Weare and Webster. F. E. Everett, comr. Hy. Dpt., Patriot Bldg., Concord. Noted Mar. 30, C. D.—Apr. 2, E. N.-R.

New Hampshire—Apr. 30, by State Hy. Dpt., F. E. Everett, comr., Patriot Bldg., Concord, gravel surfacing 2.462 mi. Swift River Rd., Project FH 8-B, Albany, Carroll Co. To exceed $30,000.

N. Y., Cooperstown — See "Contracts Awarded."

N. Y., Delhi — Apr. 29, by W. J. Howland, supt. Hys., Delaware Co., grading, foundation course 5.05 mi. Andes-Delancey Project 23, Part 3, Contr. 1.

N. Y., Penn Yan—See "Contracts Awarded."

N. Y., Rochester—See "Contracts Awarded."

N. Y., Syracuse—See "Contracts Awarded."

N. Y., Watkins Glen—See "Contracts Awarded."

Oregon—State Hy. Comm., Salem, takes bids in May, first section new Super Air Line Hy. between Salem and Portland (52 mi.). R. H. Baldock, hy. engr.

Pennsylvania—May 1, at office of W. Van Dyke, secy. Hys., Harrisburg, grading, drainage structures, 2 rein.-con. structures, one I-beam bridge 12,876 ft. R-01063 and R-01064, Menallen Twp., Bendersville Borough, Adams Co., involving 575 cu. yd. Class 2 excav.; grading, drainage, two I-beam bridges, extending 2 rein.-con. structures, bituminous surfacing bridge floor surface, 33,067 ft. R-21-8, Penn and Dickinson Twps., Cumberland Co., 908 cu. yd. Class 2 excav.; grading, drainage, rein.-con. and masonry bridge 12,499 ft. R-32025, Centre and Brush Valley Twps., Indiana Co., 734 cu. yd. Class 2 excav.; grading, drainage 11,615 ft. Route 25075, Sect. 1, North East Twp., Erie Co., 252 cu. yd. Class 2 excav.; 3,915 ft. R-49091, Sects. 1 and R-283, Ralpho Twp., Northumberland Co., 5,896 cu. yd. Class 1, 152 cu. yd. Class 2 and 1,449 cu. yd. borrow excav.; 4,200 ft. R-53—3, Sect. 1, Washington and Wayne Twps., Schuylkill Co., 30,283 cu. yd. Class 1 and 261 cu. yd. Class 1 excav.; dual type pavement consisting of two 10 ft. outside lanes of rein.-con., 10 ft. center lane of bituminous surfacing, 4 rein.-con. structures, etc. 17,887 ft. R-157, Sects. 13 and 13 A, Upper Macungie and Maxatawny Twps., Lehigh and Berks Counties, 163,259 cu. yd. Class 1, 3,177 cu. yd. Class 2 and 3,847 cu. yd. borrow excav.; fabrication and erection of deck plate girder and deck truss underpass, etc., 1,998 ft. R-161, Sect. 6, West Mahanoy Twps., Gilberton and Frackville Boroughs, Schuylkill Co., 45,492 cu. yd. Class 1 and 10,880 cu. yd. Class 2 excav.; fabrication and erection complete of through steel bridge, bituminous native stone base surfacing, shoulder grading on right side only, 878 ft. R-58026, Sect. 1, Osceola Twp., Tioga Co., 1,240 cu. yd. Class 1 and 500 cu. yd. Class 2 excav. grading, drainage 6,200 ft. Montour Co.

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Pa., Birdsboro—See "Contracts Awarded."

Pa., Dunmore—May 4, by Town Council of Dunmore Borough, Lackawanna Co., at Borough Bldg., grading, curbing, paving Ward, Delaware, Potter, Conney, Throop, Grove, Willow, Elm, and Electric Sts., Jefferson and Monroe Aves. A. J. O'Hora, secy. of council. Mastriani, boro. engr.

†Pa., Gettysburg—May 7, by Pub. Rds. Dpt. Agriculture, 1725 F St. N.W., Wash., D. C., constructing 0.22 mi. road, Project 4A, in Gettysburg Natl. Military Park. H. J. Spaeman, dist. engr.; adv. E. N.-R., Apr. 23.

Tex., Conroe—May 1, by City, H. M. Crighton, mayor, W. P. Terrell, Jr., city-secy., curbing, guttering and vit. clay storm sewers, lime rock asphalt paving, 116,800 sq. yd. streets, 121,105 sq.yd. earth excav. and fine grading, $350,000. P.W.A. project. H. P. Noyes, Conroe, engr.

Vermont—State Hy. Dpt., H. E. Sargent, chief engr., Montpelier, received no bids Apr. 10 for gravel mixed in place and refined tar surface course paving 0.7 mi. Project WPMS 1[illegible]R, Glover. Noted Apr. 7, C. D.

Wisconsin—Apr. 28, by State Hy. Comm., and Jackson County Hy. Com. at office Division Engineer, Hoeschler Bldg., La Crosse, grading, draining, shale base surfacing 0.284 mi. Pray City Point Rd. S. T. H. 54, State Project 5532, Contr. 1, incl. 15,076 cu. yd. common and borrow excav.; grading, draining, shale and gravel surfacing 1.63 mi. Galesville North Bend Rd. S. T. H. 54, State Project 5230, Contr. 1, 72,220 cu. yd. common and borrow excav.; constructing Bridge 233, one 60 ft. and two 50 ft. I-beam spans, Galesville North Bend Rd. S. T. H. 54, State Project 5230, Contr. 2, 605 cu. yd. structural excav.; Bridge 46, one 30 ft. I-beam span, Pray City Point Rd., S. T. H. 54, State Project 5532, Contr. 2, 985 cu. yd. structural excav., all foregoing Jackson Co.

CONTRACTS AWARDED

Arizona—State Hy. Dpt., Phoenix, grading, draining, aggregate surfacing 15.5 mi. road in Navajo and Apache Counties, to O. F. Fisher, 516 South 7th St., Phoenix, $244,610. Est. $200,000. Bids Apr. 9. Noted Apr. 14, C. D.

Arizona—State Hy. Comm., Phoenix, grading, draining, oiling 14.4 mi. road in Pinal Co., to Arizona Sand & Rock Co., Phoenix, $92,603. Est. $131,000. Bids Apr. 3. Noted Apr. 8, C. D.

Arizona—State Hy. Dpt., Phoenix, grading, draining, concrete paving 0.4 mi. Benson-Douglas Hy., to J. H. Casson, P. O. Box 2203, Phoenix, **$64,733.** Bids Apr. 7. Noted Apr. 16, C. D.—Mar. 26, E. N.-R.

Arkansas—State Hy. Dpt., Little Rock, grading, drainage, traffic service gravel surfacing 0.769 mi. Independence Co., to A. E. Kennedy, Poyen, **$35,196** est. $40,000***grading, drainage, traffic service gravel surfacing, 7.1 mi. and constructing three untreated timber bridges, Logan Co., to O. H. Wilson, Russellville, **$21,851** est. $40,000***grading, drainage, concrete, asphaltic surfacing 0.2 mi. Pulaski Co., to M. E. Turk, Little Rock, **$10,191** est. $20,000. Bids Apr. 16. Grand total $67,238. Received no bids Apr. 16, grading, drainage, traffic service gravel surfacing, 7.3 mi. and constructing 3 untreated timber bridges, Jackson Co., grading, drainage, constructing 2 untreated timber bridges, Randolph Co. Noted Apr. 7, C. D.—Apr. 9, E. N.-R.

California—C. H. Purcell, state hy. engr., 808 State Bldg., Los Angeles, grading, applying road mix surface treatment 11.7 mi. hy. between Box Springs and point 3 mi. east of Moreno, Riverside Co., to Oswald Bros., 366 East 58th St., Los Angeles, $155,070. Noted Apr. 3, C. D.—Mar. 19, E. N.-R.

California—State Hy. Comm., Sacramento, plant mixed surfacing and constructing shoulders, etc., on hy. between county road to Byron and east boundary, Contra Costa Co., to S. M. McGaw, 425 Lexington Ave., Stockton, $23,675. Bids Apr. 1. Noted Apr. 8, C. D.—Mar. 19, E. N.-R.

California—C. H. Purcell, state hy. engr., 808 State Bldg., Los Angeles, grading, concrete paving 5.1 mi. hy. from Santa Ana River to Alabama St., San Bernardino Co., to Matich Bros., Elsinore, $93,424***grading, placing plant mix asphaltic surface treating 0.7 mi. Little Mountain Entrance to San Bernardino, San Bernardino Co., to G. Herz, San Bernardino, $53,710***widening pavements with concrete pavement and liquid asphalt treating shoulders 8.1 mi. hy. Lancaster to Kern Co. line, Los Angeles Co., to Basich Bros. Constr. Co., Torrance, $47,000. Grand total $194,134. Bids Mar. 26, awarded Apr. 3. Noted Mar. 27, C. D.

California—At office of C. H. Purcell, state hy. engr., P. Wks. Bldg., Sacramento, grading road mix surfacing 5.1 mi. hy. between Adin and Rush Creek, Modoc Co., to Frederickson & Westbrook, P. O. Box 138, Lower Lake, **$25,400.** Bids Apr. 8, awarded Apr. 13. Noted Apr. 13, C. D.

California—C. H. Purcell, state hy. engr., 808 State Bldg., Los Angeles, asphaltic concrete paving 0.4 mi. Chapman Ave. and Glassell St., Orange, Orange Co., to C. O. Sparks, 230 East 9th St., Los Angeles, **$23,925.** Bids Apr. 2, awarded Apr. 13. Noted Apr. 10, C. D.—Mar. 19, E. N.-R.

†Federal Government

Streets and Roads (Continued)

Calif., Los Angeles—Bd. Supervs. Los Angeles Co., Hall of Records, grading, concrete paving, drains, gutters, curbs, sidewalks 0.66 mi. Sunset Blvd., from Horn Ave. to Beverly Hills city limit, to Southern California Roads Co., 2145 East 25th St., $83,548. Est. $102,000. Bids Mar. 23, awarded Apr. 6. Noted Mar. 30, C. D.—Mar. 12, E. N.-R.

Connecticut—State Hy. Comn., J. A. Macdonald, state hy. comr., Hartford, constructing 11 esplanades, North Park Ave., Bridgeport, $18,273•••4,600 ft. concrete curbs and gutters, Wethersfield, $14,592•••retaining wall, Henry St., Stratford, $2,395•••grading town field, Westport, $3,740•••grading Ann St., Fairfield, $4,429•••grading Ridgefield Barrack Grounds, Ridgefield, $5,327. W.P.A. labor. Grand total $48,756. M. Daley, Works Progress Administrator, New Haven.

Conn., Hartford—City, sheet asphalt on concrete paving Homestead Ave., Garden, Myrtle and Woodbridge Sts., recently damaged by flood, to Edward Balf Co., 173 State St., $125,217. Est. $125,000. R. N. Clark, city engr.

Ill., Galesburg—Knox Twp., furnishing, hauling, spreading 24,000 cu.yd. road gravel 20 mi. township roads, to McGrath Sand & Gravel Co., Lincoln, $1.14 cu.yd. Est. $30,000. A. R. Smith, Galesburg, engr.

Ill., Joliet—Dpt. P. Wks. & Buildings, Div. Hys., concrete paving 1.0288 mi. Sect. 44C15d, near Mokena, Will Co., to Powers-Thompson Constr. Co., Joliet, **$62,407.** Bids Mar. 18. Noted **Mar. 13, C. D.**

Louisiana—State Hy. Comn., Baton Rouge, grading, gravel surfacing 6 mi. Kelley-Intersection Route 111 Hy., Project 1130, Caldwell and La Salle Parishes, to Holmes & McKeithen, Grayson, $32,499•••grading, local iron ore surfacing 3 mi. Central School-Haskins Hy., Route 640, Project 1133, Franklin Parish, to J. H. Parks, Delhi, $13,520•••grading, gravel surfacing 9.627 mi. Pielette-Intersection Route 236, Hy. Route 680, Project 1114, Lafayette Parish, to Louisiana Materials Co., 1510 Julia St., New Orleans, $35,652. Grand total $81,671. Bids Feb. 5. State Hy. Comn., Baton Rouge, rejected bids Feb. 5, grading, local iron ore surfacing 4.97 mi. Columbus-Negreet Hy., Route 536, Project 1092, Sabine Parish. Noted Feb. 17, C. D.—Jan. 16, E. N.-R.

Mass., Haverhill—City, G. E. Dalrymple, H. E. Prescott, comr. Hys., City Hall, reconstructing hys. and sidewalks, $124,000; sidewalks, $42,000; Lowell Ave. Bridge, $30,000, damaged by flood, day labor. Grand total $196,000. Also sewers by day labor, no estimate.

Mass., Springfield—City, C. W. Phillips, supt. Dpt. Streets & Eng., City Hall, constructing streets, sewers, walks in Huntington, Alfred, Thomas, Greenwich, Portland, Medford and other streets, $77,715; repairing Riverside Rd. and build dike along Connecticut River, $20,843, day labor under **W.P.A.**

Mass., Webster—Town, J. A. Patenaude, chn. Bd. Selectmen, B. A. Wakefield, Town Hall, town engr., bituminous macadam and gravel repairs to various streets, damaged by flood, day labor. Est. $33,000.

Michigan—State Hy. Dpt., Escanaba, grading, drainage structures, concrete surfacing 2.283 mi. Iron Co., to H. Holmes, Crystal Falls, $142,304. Noted Mar. 13, C. D.

Michigan—State Hy. Comn., W.P.A. Procurement Office, Lansing (**P. means Project**), oil aggregate surfacing 8 mi. P. 58, Allegan Co., to W. J. Lang Constr. Co., 7 South Dearborn St., Chicago, Ill., $34,912•••6 mi. P. 117, Antrim Co., to Cooke Asphalt Paving Co., 1216 Penobscot Bldg., Detroit, $24,360•••4.5 mi. P. 63, St. Joseph Co., and 5.6 mi. P. 78, Calhoun Co., to Globe Constr. Co., Kalamazoo, $18,459 and $22,523 respectively•••4 mi. P. 134, and 2 mi. P. 98, Jackson Co., to Brooks Constr. Co., 1123 Barthold St., Fort Wayne, Ind., $15,364 and $7,682 respectively•••9.4 mi. P. 100, Lenawee Co., to Ann Arbor Constr. Co., Ann Arbor, $38,126•••4.2 mi. P. 74, Luce Co., and 9 mi. P. 106, Mecosta Co., to Detroit Asphalt Paving Co., 702 Transportation Bldg., Detroit, $16,317 and $33,516 respectively•••13.5 mi. P. 102, Newaygo Co., to Warren Bros. Road Co., Flint, $53,379•••7.25 mi. P. 99, Oakland Co., to Michigan Asphalt Paving Co., Royal Oak, $28,275. Grand total $292,913, Iron Co. Bids Apr. 1. Rejected bids April 1, oil aggregate surfacing 8.2 mi. P. 69. Noted Apr. 13, C. D.—Apr. 16, E. N.-R.

Michigan—See "Bridges and Grade Crossings."

★ **Mississippi**—E. D. Kenna, dir. State Hy. Comn., Jackson, to A. G. Seifried, Baton Rouge, La., roadside improvement and beautification 0.375 mi. Newton Co., $1,829; 0.198 mi. Jones Co., $5,380; 0.201 mi. Leflore Co., $3,887•••to Cobb Bros. Constr. Co., Citizens Bank Bldg., Meridian, grading, drainage structures, bridges stabilized base course 6.757 mi. WPH 74C, $88,765; and grading, drainage structures and temporary surface course 2.96 mi. WPSO 247B, $36,729, both Neshoba Co. •••to J. H. Morrow, Greenville, grading, drainage structures, bridge 5.578 mi. WPGM 139E, $53,205; and grading, drainage structures, bridges, gravel surface course 0.359 mi. WPH 138F, $4,155, both Bolivar Co.•••to Forcum James Constr. Co., Dyersburg, Tenn., grading, drainage structures 0.236 mi. WPSS 268A, $1,744; and grading, drainage structures, overpass bridge 0.334 mi. WPGM 269B, $20,641, both Chickasaw Co.•••to Coggins & Dearmont and B. G. Coggins, Inc., Chipley, Fla., and Nettleton, Miss., grading, drainage structures, gravel surface course 0.154 mi. WPMH 253B, $1,782; and 0.498 mi. WPGM 253C, $49,511, both Lee Co.•••to E. E. Morgan, Century Bldg., Jackson, and Currie & Corley, Raleigh, 8.835 mi. Winston Co., $81,437•••to C. Weaver Co., Inc., Walthall Hotel, Jackson, 3.692 mi. Prentiss Co., $50,591•••to J. W. Funchess & Son, Hazlehurst, 4.988 mi. Lawrence Co., $46,574 •••to Hodgkin-Adams Constr. Co., Winchester, Ky., 4.976 mi. Amite Co., $42,163•••to J. W. Gwin & Co., Comer Bldg., Birmingham, Ala., grading, gravel surface course and bridges 12.166 mi. Clarke Co., $60,473•••to Seigler Constr. Co., Nashville, Tenn., 0.53 mi. Montgomery Co., $45,186•••to F. S. Neely, Armory, 3.74 mi. Lowndes Co., $87,436. Grand total $681,488. Bids Mar. 17. Award held up improving 3.021 mi. Ripley-Booneville Hy., Tippah Co., **P.W.A.** Noted Mar. 25, C. D.—Mar. 12, **E. N.-R.**

Missouri—State Hy. Dpt., Jefferson City, to Simmons & Ferman and L. W. Spengler Constr. Co., LaPlata, grading 0.112 mi. Lancaster Rd. South, Schuyler Co., **$14,989;** 0.309 mi. same road, WPSO 747B, **$6,793;** and 0.153 mi. WPMS 747A, **$3,255**•••to Davis Constr. Co., Boonville, 0.299 mi. road in Vernon Co., **$76,399** •••to Ackley Bros. Constr. Co., Kansas City, 3.647 mi. DeKalb Co., **$31,267**•••to C. H. Atkinson Paving Co., Chillicothe, 0.301 mi. Audrain Co., **$75,565.** Grand total $208,468. Bids Mar. 13. Noted Mar. 18, C. D.—Mar. 5, E. N.-R.

Mo., Farmington—City, 56,159 sq.yd. bituminous resurfacing, 5,185 lin.ft. curbing, 10 concrete box inlets complete with grate, 165 lin.ft. storm sewer pipe; 42 each adjusting manholes; 500 lin.ft. 12- to 18-in. metal pipe culverts; 348 tons base course; 17.1 cu.yd. concrete, 2,490 lb. reinforcing steel; 64 sq.yd. concrete removal and 30 tons bituminous resurfacing material, to Trimidad Asphalt Mfg. Co., 600 South Theresa Ave., St. Louis, $43,148. Est. $37,500. **P.W.A.** Bids Mar. 19. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

N. J., Trenton—P. Morton, engr., City Hall, vitr. brick on 8 in. concrete paving Front St., (1) from Broad to Montgomery Sts., (2) from Willow to Broad Sts., for City, to Union Paving Co., 666 Chester Pike, Norwood, Pa., (1) $11,303, (2) $19,471. **P.W.A.** Bids Mar. 10. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

N. Y., Cooperstown—Village, widening avenue 2 ft. on each side from Chestnut St. to Susquehanna River Bridge, and constructing storm sewer and installing curbing, relief labor. To exceed $20,000. **W.P.A.** W. A. Calabrino, Telephone Bldg., Binghamton, procurement officer W.P.A. will purchase materials.

N. Y., New York—S. Levy, pres. Manhattan Boro. Municipal Bldg., laying and relaying sidewalks, to F. Mascali & Sons, 645 East Tremont Ave., $43,140; repaving asphalt car tracks, to Venetian Contg. Co., 2 Lafayette St., $21,843. Bids Mar. 26. Noted Mar. 27, C. D. —Mar. 19, E. N.-R.

N. Y., Penn Yan—Bd. Supervs, Yates Co., C. Havens, supt., repairing and improving county highways, own forces. $35,000.

N. Y., Rochester—City, Dpt. P. Wks., City Hall, repairing Highland and Elmwood Aves., relief labor. To exceed $25,000. **W.P.A.** A. Hackett, 1460 South Ave., procurement officer, W.P.A. will purchase materials.

N. Y., Syracuse—City, City Hall, regrading, resurfacing Onondaga Park, Gilbert Ave., Huntley and Herkimer, Sts., grading Fountain St., constructing gravel paths along Dutton Ave. and Rockwell Rd., resurfacing roadway and parkway area in Onondaga Park, resurfacing 8 tennis courts in Burnet Ave. and 8 in Onondaga Park by relief labor. To exceed $25,000. **W.P.A.** G. L. Noble, Old Post Office Bldg., Syracuse, procurement officer, W.P.A. will purchase materials.

N. Y., Syracuse—City, City Hall, R. D. Marvin, mayor, resurfacing roads and walks, landscaping grounds at main sewage disposal plant, 2nd Ward, relief labor. $27,443. **W.P.A.** G. L. Noble, Old Post Office Bldg., Syracuse, procurement officer, W.P.A., will purchase materials.

N. Y., Watkins Glen — City repairing all streets, relief labor. $37,000. **W.P.A.** J. F. Williamson, Federal Bldg., Elmira, procurement officer W.P.A. will purchase material.

★ **Ohio**—J. J. Jaster Jr., state hy. dir., Columbus, grading, drainage structures, traffic bound paving 0.802 mi. Winesburg-Dundee Rd., and 0.653 mi. Sect. "B" Brewster-Shanesville Rd., Tuscarawas Co., to M. B. Guran, 1075 River St., Akron, $22,130 and $29,920 respectively est. $22,420 and $35,359 respectively••• grading, drainage structures, brick and concrete paving 0.653 mi. and constructing concrete bridge with continuous steel beams, Tuscarawas Co., to A. J. Baltes, 181 Benedict Ave., Norwalk, $220,307 est. $256,851•••constructing concrete arch culvert, and timber bridge on steel beams, 3,355 mi. Ashland Co., to Purdy Constr. Co. and G. B. Herring & Son, Mansfield,

Federal Government

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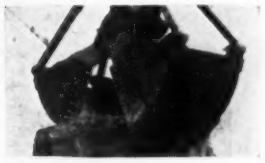

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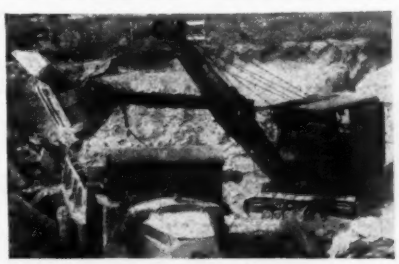

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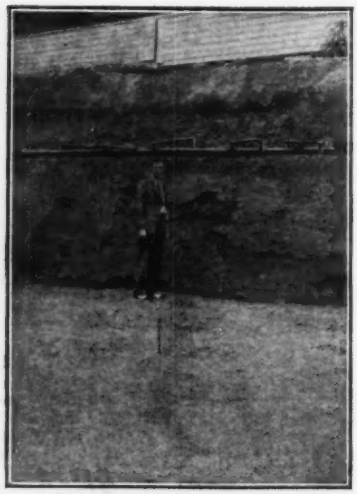

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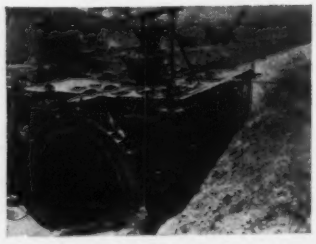

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Streets and Roads (Continued)

$225,657 est. $226,019***relocating and constructing steel truss bridge with two concrete approach spans 1.724 mi. Coshocton Co., to Connell & Laub, 51 Woodcrest Ave., Dayton, 196,870 est. $214,514. Grand total $694,884. Bids Apr. 7. Received no bids Apr. 7, grading, drainage structures, traffic bound paving 0.814 mi. Tuscarawas Co., $13,490. Noted Mar. 27, C. D.—Apr. 2, E. N.-R.

★ **Ohio—J. J. Jaster, Jr.,** state hy. dir., Columbus, grading, drainage structures, traffic bound paving 1.862 mi. Coshocton Co., to W. P. McCarren, Walhounding, $38,233 est. $38,733***grading, drainage structures, road stabilized binder soil and calcium chloride paving, roadside improvement 1.657 mi. Harrison Co., to Boso & Ritchie, Ravenwood, W. Va., $214,047 est. $226,831***grading, drainage structures, salvage brick, widening and paving, roadside improvement 2.646 mi. Trumbull Co., to Victor Olson Constr. Co., 552 Market St., Youngstown, $251,836 est. $294,640***roadside improvement 2.943 mi. Union Co., to Utica Floral Co., Mill St., Utica, $5,834 est. $5,834***grading, drainage structures, traffic bound paving 0.571 mi. and constructing grade crossing elimination under Pennsylvania R.R. Co., and building railroad grade separation structure, Harrison Co., to O'Connor Kipf Co., 2006 St. Clair Ave., Cleveland, $94,854 est. $106,157. Grand total $604,804. Bids Apr. 10. Noted Apr. 2, C. D.

O., Canton—City, 23 ft. bituminous paving, curbing, guttering and sidewalks on Rosyln Ave, N. W., to H. H. Wise, 1126 11th St. N. W., Canton, $30,575. Est. $36,618.

★ **Oklahoma—**State Hy. Dpt., Oklahoma City, grading, drainage 2.03 mi. roads in Garvin Co., and 1.49 mi. Grant Co., to Murveldt Lawson, El Reno, $23,988 and $19,015 respectively, est. $24,214 and $19,330 respectively***3.27 mi. Grady Co., to J. E. Smith & Sons, Noble, $18,236 est. $16,086***2.77 mi. Murray Co., to Brooks & Dahlgren, Insurance Bldg., Oklahoma City, $32,346 est. $34,645***5.5 mi. McCurtain Co., to S. E. Evans, Fort Smith, Ark., $49,764 est. $50,049***0.74 mi. Hughes Co., to Smith & Son, Noble, $6,410 est. $6,516***1.02 mi. Adair Co., to F. B. Richards, Stillwater, $12,911 est. $13,005***7.63 mi. Alfalfa Co., to G. E. Kech, Fairview, $29,138 est. $29,199***2.66 mi. Nowata Co., to Moran & Buckner, Muskogee, $21,072 est. $24,925***5.45 mi. Stephens Co., to S. A. Maxy, Durant, $42,916 est. $44,913***0.478 mi. Cimarron Co., to L. S. Fisher, Woodward, $6,873 est. $6,986***1.65 mi. Pittsburg Co., to G. H. James, 837 East 15th St., Oklahoma City, $38,304 est. $39,062***5.04 mi. Marshall Co., and 5 mi. Hughes Co., to Joyce Logan Co., Key Bldg., Oklahoma City, $25,184 and $29,469 respectively, est. $26,120 and $30,183 respectively***3 mi. McClain Co., to Harrison & Harrison, Lyndsey, $17,820 est. $18,472***2.43 mi. Payne Co., to Briscoe Constr. Co., Stillwater, $69,390 est. $73,093***concrete paving 5.93 mi. Major Co., to Ryan Richards, Inc., 1801 East 4th St., Oklahoma City, $135,213 est. $156,865. Grand total $578,049. Bids Apr. 7. Received no bids Apr. 7, improving roads in Cole, Okfuskee, Jackson, Garfield, Hughes and Logan Counties. Noted Apr. 2, C. D.—Apr. 9, E. N.-R.

Pennsylvania—At office W. W. Van Dyke, secy. Hys., Harrisburg, bituminous on native stone surfacing 1.47 mi. Route 17038, Sect. 1, Lawrence and Boggs Twp., Clearfield Co., to J. Dean Clark, Lewistown, **$20,725**; extending stone masonry arch and bituminous on native stone widening, 496 lin.ft. Route 15 and 283, Catawissa Twp., Columbia Co., to R. Rosser, 503 Bennett Bldg., Wilkes-Barre, **$7,228.** Bids Mar. 27. Noted Apr. 2, C. D.—Mar. 19, E. N.-R.

Pennsylvania—Dpt. Hys., Harrisburg, rein.-con. paving, rein.-con. structure extension, rein.-con. widening, etc., 3.29 mi. Route 854, Sect. R-4, Route 276, Sect. R-1-b, Munster and Cresson Borough, Cambria Co., to Paul Constr. Co., Cresson, **$151,676.** Bids Mar. 6. Noted Nov. 12, C. D.—Mar. 19, E. N.-R.

Pennsylvania—At office W. W. Van Dyke, secy. Hys., Harrisburg, bituminous on native stone surfacing 0.33 mi. Route 49040, Sect. 1, Upper Augusta Twp., Northumberland Co., to Central Builders Supply Co., Sunbury, **$8,606*****bituminous on modified stone and rein.-con. paving 2.32 mi. North Ave. Extension, South Strabane Twp., East Washington Borough, City of Washington, Washington Co., to Tri-State Eng. Co., Waynesburg, **$19,527***bituminous on modified stone surfacing 0.96 mi. Route 627170-62171, Peters Twp., Washington Co., to R. E. Furman, Waynesburg, **$19,051.** Grand total $47,184. Bids Mar. 13.

Pennsylvania—At office W. W. Van Dyke, secy. Hys., Harrisburg, rein.-con. paving, rein.-con. structure, concrete and bituminous on crushed stone base for flares variable width 2.07 mi. Route 141, Sect. 4, Tilden Twp., Berks Co., to John H. Swanger, Brenneman Bldg., Lancaster, **$118,128;** bituminous on native stone surfacing and 2 rein.-con. bridges 2.16 mi. Route 46015, Limerick and Upper Providence Twps., Montgomery Co., to James J. Skelly Co., Inc., Media, **$46,345.** Bids Mar. 26. Noted Apr. 2, C. D.—Mar. 5, E. N.-R.

Pennsylvania—W. Van Dyke, secy. Hys., Harrisburg, rein.-con. paving 3.04 mi. Elk Co., to W. C. Gates, Tyrone, $135,700; bituminous on native stone paving, rein.-con. and masonry bridge, to W. N. Quigley, Mifflin, $50,057. Bids Mar. 13. Noted Mar. 19, C. D.—Mar. 26, E. N.-R.

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Pa., Birdsboro—City, constructing sidewalks at Schuylkill River Bridge, $11,602; resurfacing with bituminous materials and removing abandoned trolley tracks West 1st St., $7,985; storm sewer in 4th and Jefferson Sts., $11,212; drainage and sewer in Plum Alley, $6,099 day labor. Grand total $36,498. **W.P.A.** W. H. Dechant & Sons, 632 Washington Ave., Reading, engrs.

Pa., Lock Haven—See "Waterworks."

Texas—G. Gilchrist, state hy. engr., Austin, grading, drainage structures, gravel surface course paving 6.267 mi. State Hy. "F," Bastrop Co., to Cage Bros., and J. S. Ruby, Bishop, **$28,784** est. $30,000***grading, drainage structures and caliche roadbed treatment 7.23 mi. State Hy. "F," Kinney Co., to H. B. Zachry, Laredo, **$37,814** est. $40,000***grading, drainage structures, iron ore topsoil base course surfacing 2.166 mi. State Hy. "F," Sabine Co., to A. L. Mays, Jasper, **$15,257** est. $16,000***grading, drainage structures, select material surfacing 9.786 mi. State Hy. "F," El Paso Co., to Lee Moor Contg. Co., El Paso, $43,260 est. $45,000***grading, drainage structures, sledged stone base course paving 4.158 mi. State Hy. "F," Hunt Co., to J. T. Leslie, Bailey, **$49,396** est. $50,000. Grand total $174,511. Bids Mar. 18. New **P.W.A.** Noted Mar. 25, C. D.

Texas—G. Gilchrist, state hy. engr., Austin, grading 0.062 mi. State Hy. 66, Hidalgo Co., to Cage Bros., Bishop, **$7,761** est. $10,000*** double asphalt on caliche paving 6.331 mi. State Hy. 9, F.A.P. 638-B and D, Martin and Howard Counties, to Thomas & Ratliff, Rogers, **$41,291** est. $40,000***grading, drainage structures 10.368 mi. State Hy. 21, Burleson Co., to Jas. Spencer & Son, and W. S. Crawford, 4425 Avondale St., Dallas, **$88,301** est. $100,000***triple asphalt on crushed gravel caliche surfacing 2.859 mi. State Hy. 27, Kimble Co., to H. B. Zachry, Laredo, **$28,967** est. $30,000. Grand total $166,320. Bids Mar. 18. Noted Mar. 25, C. D.

Utah — State Road Comn., Salt Lake City, grading, draining, gravel roadbed surfacing 2.193 mi. St. High Circleville Canyon, Piute and Garfield Counties, incl. 68,700 cu.yd. unclassified excav., to F. Whiting, Keysville, **$39,698** est. $54,058***5.337 mi. State Hy. between Mayfield and Gunnison, Sanpete Co., 65,600 cu.yd. unclassified excav., to A. O. Thorne, Springville, **$40,782** est. $45,652***construction steel I-beam and concrete overhead structure over railroad tracks, 4.4 mi. State Hy. at L. A. & S. L. R.R. crossing, Millard Co., to Strong & Grant, Springville, **$80,789** est. $94,152. Grand total $161,269. Noted Apr. 6, C. D.

Virginia—Dpt. Hys., Richmond, improving 0.76 mi. Chesterfield Co., to R. K. Williams, Richmond, **$62,641***0.86 mi. and 1.5 mi. Charlotte Co., to Perkins Barnes Constr. Co., Blackstone, **$6,473***5.48 mi. Albemarle Co., to Chandler Bros., Inc., Virgilina, **$77,883*** south of Boone Mill, Franklin Co., to M. A. Goode, Virgilina, **$6,665***Newton and Stoker St., Danville Co., to L. Ellis & F. D. Cline, Greensboro, N. C., **$43,389***intersecting Route 501 Rockbridge Co., to Pocahontas Constr. Co., Cass, W. Va., **$34,967***relocation Route C615, Roanoke Co., to M. S. Hudgins, Roanoke, **$5,133***0.06 mi. Victoria Co., to C. M. Buchanan & Co., Clarksville, **$1,070***0.17 mi. relocation Briggs Siding, Clarke Co., to R. W. Moore & Co., Staunton, **$8,507.** Grand total $246,668. Bids Apr. 9. Cancelled bids to have been opened Apr. 9, improving 0.049 mi. Fairfax Co.; 8.28 mi. and 1.97 mi. Smyth and Wythe Counties; 5.8 mi. and 3.79 mi. Charles City. Noted Apr. 15, C. D.—Apr. 23, E. N.-R.

Wash., Olympia—Thurston Co., grading, surfacing 7.81 mi. Boston Harbor, Calvin-Mason and Shincke Rds., to H. P. Dorsey, 2709 Park Dr., Bellingham, **$30,039.** Noted Apr. 13, C. D.—Apr. 16, E. N.-R.

Wisconsin — State Hy. Comn., Madison, grading, drainage, concrete sidewalk on 2.646 mi. Dane Co., to J. M. Walsh, 2319 Hollister Ave., Madison, $20,873***grading, draining, gravel surfacing 12.884 mi. Rock Co., to Wisconsin Crushing Co., Edgerton, $24,586***constructing eight 25 ft. and two 29 ft. I-beam and timber spans, Crawford Co., to Brennan Bros., Lansing, Ia., $23,405. Grand total $68,864. Bids Mar. 27. Noted Apr. 2, C. D.—Apr. 9, E. N.-R.

★ **Quebec—**Roads Dpt. of Province, Quebec City, repairing roads damaged by floods, day labor. Est. exceeds $500,000.

EARTHWORK, IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

†**Arizona—**Bureau Reclamation, Denver, Colo., withdrew bids to have been opened Apr. 7, constructing Bartlett Dam for Salt River Project. Bids returned unopened. R. F. Walter, ch. engr. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

Calif., San Jose—Santa Clara Valley Water Conservation Dist., election May 12, $400,000 bonds to finance completion of several dams in

†*Federal Government*

Earthwork, etc. (Continued)

district. F. H. Tibbetts, Alaska Comm. Bldg., San Francisco, engr. Noted Sept. 11, C. D.—Sept. 19, E. N.-R.

★ †**Ill., Alton**—U. S. Eng., St. Louis, Mo., announced cancellation of contract with John Griffiths & Sons Co., Builders Exchange Bldg., Chicago, Ill., for constructing twin locks for Lock and Dam 26 on Mississippi River, here. The main lock has been completed and about $750,000 worth of work remains to be done on auxiliary lock. Noted Jan. 3, 1934, C. D.—Jan. 11, 1934, E. N.-R.

La., Hackberry—Stanolind Oil & Gas Co., Houston, Tex., plans constructing 2,400 ft. canal with 6½ ft. depth at mean low water, with 40 ft. bottom, connecting existing canal with Nelson Bayou.

★ †**Massachusetts and New Hampshire**—U. S. Eng., Custom House, Boston, Mass., making plans flood control of Merrimac River. $7,725,000.

★ †**Montana** — Bureau Reclamation, Denver, Colo., plans constructing Chain-of-Lakes Reservoir Dam, to be earthfill, 75 ft. high, with concrete lined tunnel outlet, for Milk River Project. $2,000,000. R. F. Walter, ch. engr.

N. Y., Geneva—New York State Dpt. Parks, State Bldg., Albany, plans constructing dams in Taughannok State Park, near here as flood control measure. $60,000. T. F. Farrell, Albany, state engr.

N. Y., Jamestown—City, Dpt. P. Wks., plans straightening, widening, deepening Chadakoin River channel from Boatlanding through city to eastern city line, about 3 mi., $100,000. May apply for federal funds. L. L. Graham, city engr.

O., Portsmouth—Scioto Co., election May 12, $75,000 bonds for improvement of city's flood defenses. $300,000. P.W.A. to furnish rest of cost.

BIDS ASKED

†**Conn., Hartford** — U. S. Eng., Providence, R. I., taking bids dredging 60,000 cu.yd. material from Connecticut River, below here. Noted Apr. 10, C. D.—Apr. 16, E. N.-R.

Idaho, Caldwell—Apr. 27, by Pioneer Irrigation Dist., constructing 5 drainage ditches, incl. 202,667 cu.yd. earth excav. P.W.A. project.

Ia., Clear Lake — May 2, by Bd. Trustees Drainage Dist. 40, Cerro Cordo Co., cleaning out drainage ditch, incl. 29,570 cu.yd. excav. C. F. Merten, co. engr.

★ †**Mont., Fort Peck**—May 21, by U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, Mo., building and placing 8 emergency gates in 4 tunnels with operating machinery, electrical equipment for Fort Peck Dam. $1,000,000 unofficial.

N. H., Pittsburgh—Apr. 30, by N. H. Water Resources Bd., 14 South Main St., Concord, exploratory drillings at dam site and borrow pit areas of porposed reservoir on Connecticut River, consisting of 750 lin. ft. overburden drilling, 380 lin. ft. core drilling in bedrock, 80 undisturbed samples, 100 lin. ft. casings.

†**N. Y., Fort Niagara**—Apr. 29, by Treas. Dpt., c/o U. S. Coast Guard Headquarters, Wash., D. C., constructing 366 lin.ft. straight wall type sheet steel pile bulkhead and accessories at U. S. Coast Guard Station.

Vt., Rutland—See "Contracts Awarded."

B. C., Prince Rupert—May 7, by Secretary Dpt. P. Wks., Ottawa, Ont., constructing floating breakwater and dredging 11,000 cu.yd. silt, gravel, boulders. $17,000. K. M. Cameron, Dpt. P. Wks., Ottawa, Ont., engr.

CONTRACTS AWARDED

California — State Hy. Comn., State Bldg., Los Angeles, constructing storm protection drainage system, 5.9 mi. long, between Bendel's Corner to Imperial Co. line, Riverside Co., to Mittry Bros., 5531 Downey Rd., Los Angeles, $44,090. Bids Apr. 2, awarded Apr. 13. Noted Apr. 9, C. D.—Mar. 19, E. N.-R.

†**Calif., San Francisco**—U. S. Eng., Custom House, San Francisco, furnishing 209,000 tons rock and constructing rubble retaining wall about 16,000 ft. long enclosing upper levels of fill to be made on shoal in San Francisco Bay, north of Yerba Buena Island, Schedules A and B, to Marinap Corp., 503 Market St., $278,250. Bids Apr. 9, awarded Apr. 14. Noted Apr. 14, C. D.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, dredging channel to depth of 27 ft. at mean low water from downstream side of Weymouth Fore River Bridge, through bridge and upstream for approximately 2,800 ft., Quincy and Braintree, to J. S. Packard Dredging Co., 1 Court St., Boston, $50,620. Bids Apr. 3, awarded Apr. 8. Noted Apr. 13, C. D.

Mass., Springfield—See "Streets and Roads."

†**Tex., Beverly** — Reclamation Bureau, Dpt. Commerce, Wash., D. C., constructing dike north of Hamilton Reservoir, on Colorado River, near here, tentatively awarded to Brown & Root, Austin and Burnett, $38,507.

Vt., Rutland—City, H. B. Whitter, clk., E. L. Tracey, supt. P. Wks., City Hall, constructing rock and earthern dike average 10 ft. on banks of Otter Creek, day labor. $50,000.

UNCLASSIFIED

PROPOSED WORK

Ariz., Globe—STADIUM—City, H. E. Stevenson, supt., plans constructing stadium in School Hill Park. $27,000. W.P.A. project.

Calif., San Francisco—HANGARS, etc.—See "Public Buildings."

†**Conn., New London**—WHARF—Con. Q. M., Fort H. G. Wright, making plans rebuilding portion timber, wood pile government wharf on Thames River on Fishers Island. $25,000.

Conn., West Hartford (br. Hartford) — SWIMMING POOL—Town, R. L. Loomis, mgr., appropriated funds for purchase of 3½ acres of land, South Quaker Lane, to be developed for swimming pool. $30,000.

Idaho, Twin Falls — HANGAR — City, J. E. Hayes, engr., plans constructing 85x100 ft., brick, frame hangar, machine shop, office building, lighting grounds and fencing 230 acres, at Municipal Airport. $150,000.

Ind., South Bend—AIRPORT—Municipal Bd. Aviation, City Hall, made plans constructing new municipal airport, incl. 1,430 ft. hard paved runways, 100 ft. wide; 2 story, 30x84 ft. administration building, 1 and 2 story 80x140 hangar, 4 ft. wire fence around entire field, sewage disposal plant. $400,000. P.W.A. project. R. E. Keller, South Bend, engr.

Kan., Junction City—SWIMMING POOL, etc. —City, Louise Hicks, clk., defeated $25,000 bonds rein.-con. swimming pool and bathhouse. Application for $30,000 P.W.A. grant still pending, and if finally approved city may try again to vote on bonds to cover its share of cost of a more elaborate pool.

Kan., Wellington — SWIMMING POOL and BATHHOUSE—City, Bernice S. Lindberg, clk., soon takes bids rein.-con. swimming pool and bathhouse. $25,000 bonds voted. Paulette & Wilson, Salina, engrs.

La., Lake Charles—PIPE LINE—Union Sulphur Co., Lake Charles, plans constructing 14½ mi. 6 in. welded oil pipe line from Rose Bluff Tank farm to Old Town Bay field, Calcasieu Parish. Est. $125,000.

Mass., Newburyport — WHARF — Socony-Vacuum Oil Co., Inc., 31 St. James Ave., Boston, plans pile, timber wharf. $23,000. Private plans.

Mich., Algonac—PARK—Bd. Trustees Wayne Co. Park Comn., preliminary plans made by County Bd. Park Trustees, Barlum Tower, Detroit, for developing 1,600 acres for National Park purposes, near here, on St. Clair River, incl. grading, drainage structures, bridges, road construction, convenience stations and athletic fields. $100,000.

Minn., Livingston — TUNNEL — Northern Pacific R.R. Co., B. Blum, ch. engr., 176 East 5th St., St. Paul, plans Muir Tunnel improvements, 13 mi. west of here, incl. rebuilding 3,653 ft. roadbed in tunnel, new rails, ties and ballast, rebuilding walls and roof of tunnel in part.

N. Y., Rochester—FLOOD LIGHTS, etc.—Sears Roebuck & Co., Homan St., Chicago, Ill., plans completed and soon takes bids installing flood lights, paving and installing drainage sewers in large parking lot at Genesee and Monroe Sts.

N. Y., Rochester—UNDERGROUND WIRING —Rochester Gas & Electric Co., East Ave., plans installing underground wiring and 105 sodium lights, each 1,000 candle power on Summerville Rd.

N. Y., Rome—PARK—City, City Hall, plans developing municipal park and recreation center, incl. swimming pool $55,000, paving park roads $86,000, wading pools $7,000, shelter house $12,000, pavilion $3,000, grandstand $4,000, 10 drinking fountains $1,500, 8 fireplaces $800; toboggan run $2,000, water supply system 6,000; sanitary sewerage system $6,000, golf course $20,000, storm water drainage $7,000, landscaping, grading, etc. $21,000, 16 tennis courts $8,000, soccer field $2,500, 4 skating rinks, $8,000, bridle paths $1,000, equipment $12,000, softball diamonds $5,000, storehouse $30,000, extras $3,000, and engineering $10,000. Total est. $319,800. R. P. Wilson, comr. P. Wks.

N. Y., Saranac Lake — POWER SYSTEM — City, City Hall, plans constructing municipal power system, $478,181. P.W.A. project.

N. C., Newbern—AIRPORT—City plans airport on Trent River. $90,000. W.P.A. application approved. T. G. Matthews, project supervisor, Bureau of Air Commerce, approved plans.

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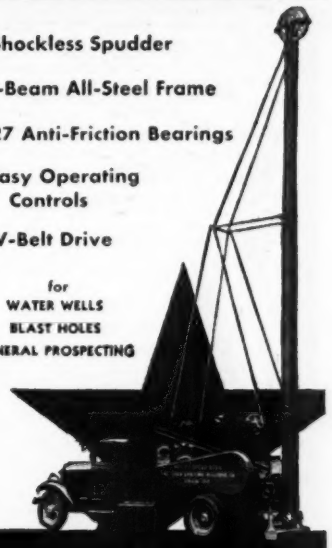

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†*Federal Government*

Unclassified (Continued)

O., Bellefontaine — RURAL ELECTRIFICATION—Logan Co. Cooperative Power and Light Assn., soon takes bids on materials for 65 mi. line, complete project will total 215 mi., serving 860 new customers.

O., Columbus—RURAL ELECTRIFICATION—Champaign Rural Electric Cooperative System, at office Farm Bureau Rural Electric Cooperative Columbus, soon lets contract rural electrification.

O., Wellington—RURAL ELECTRIFICATION—Lorain-Medina Rural Electric Cooperative, Inc., soon takes bids 168 mi. line to serve over 650 new customers.

Okla., Oklahoma City—GAS LINE—Phillips Petroleum Co., Bartlesville, made preliminary plans constructing 13,200 lin.ft. 8 in. natural gas line on Kelley Ave. $28,000. A. H. Riney, Bartlesville, engr.

Okla., Oklahoma City—GAS LINE—Empire Pipe Line Co., Bartlesville, making surveys constructing 4 mi. 8 in. high pressure gas line on Grand Blvd. $45,000. Private plans.

Okla., Oklahoma City—OIL PIPE LINE—Barnsdall Oil Co., Tulsa, made preliminary plans 12,880 lin.ft. 8 in. oil pipe line, Kelly Ave. $27,000. Private plans.

Okla., Oklahoma City—OIL PIPE LINE—Barnsdall Oil Co., 1546 West Main St., made preliminary plans constructing 16,000 lin.ft. 6 in. gas lines on 36th, Phillips, Lindsey and Laird Sts. $27,000. L. J. Knott, Oklahoma City, engr.

Okla., Oklahoma City—PIPE LINE—Anderson-Kerr Oil Co., 1st Natl. Bank Bldg., made preliminary plans constructing 13,700 lin.ft. 8 in. oil pipe line on Northeast 24th St. $30,000. T. Kerr, c/o owner, engr.

Okla., Pauls Valley—OIL PIPE LINE—Sinclair Prairie Co., Independence, Kan., making surveys 42 mi. 8 in. oil line from Ada to Pauls Valley. $200,000. Private plans.

FOREIGN 6 6nn

Pennsylvania — GAS LINE — Manufacturers Light & Heat Co., Union Trust Bldg., Pittsburgh, plans purchasing facilities of Somerset Home Gas Co., Somerset, and improving same, also constructing 8½ mi. pipe line from Berlin to Somerset. **Maturity soon.** To exceed $23,000. Private plans.

Tex., Monahans—GAS SYSTEM—City, c/o E. R. Hill, mayor, plans gas system. $50,000.

Ont., Ottawa—SUBDIVISION—Lakeside Park plans new subdivision of 108 lots in west end of city to be called Lakeside Park, incl. watermains, new streets, sewers, lighting streets, sidewalks, etc. $140,000.

Ont., Toronto—TANKS—Universal Petroleum Co. Ltd., Northern Ontario Bldg., Bay St., plans constructing two 1 m.g. tanks.

†T. H., Pearl Harbor—QUAY WALL—Yards & Docks, Navy Dpt., Wash., D. C., rejected bids Mar. 25, constructing east quay wall extension, Spec. 8014. Noted Mar. 30, C. D.—Mar. 5, E. N.-R.

BIDS ASKED

Calif., Bakersfield—HANGAR, etc.—See "Contracts Awarded."

Calif., Oakland—AIRPORT DEVELOPMENTS—See "Contracts Awarded."

Conn., Hartford — PARKS — See "Contracts Awarded."

Florida—RURAL ELECTRIC POWER LINES—See "Contracts Awarded."

†Illinois—WATERFOWL REFUGE—May 12, by U. S. Dpt. Agriculture, certain construction in connection with Chautauqua Migratory Waterfowl Refuge, in Mason Co., incl. 153,000 cu.yd. embankment, 26,000 cu.yd. excav.

Kansas—OIL and GAS DEVELOPMENT—See "Contracts Awarded."

Mass., Fitchburg—RETAINING WALL—See "Contracts Awarded."

New York—STATION FINISH WORK—Apr. 28, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, constructing station finish work for part of Rapid Transit R.R. Route 108, Sects. 10 and 11, at Sutphin Blvd., Parsons Blvd. and 169th St. Stations.

Ok'a., Oklahoma City—GAS and OIL DEVELOPMENT—See "Contracts Awarded."

Okla., Oklahoma City—GAS PIPE LINE—See "Contracts Awarded."

Oklahoma—OIL and GAS DEVELOPMENT—See "Contracts Awarded."

Pa., Hollidaysburg—GAS LINES—See "Contracts Awarded."

Pa., Titusville—AIRPORT—See "Contracts Awarded."

South Carolina — ELECTRIFICATION DISTRIBUTION SYSTEMS—Apr. 27, by State Rural Electrification Authority, 1539 Main St., Columbia, furnishing materials, equipment, tools, labor, complete electrification distribution systems, designated as Aiken "X," Anderson "B," Calhoun "A," Fairfield "B," Fairfield "C," Hampton "B," Kershaw "G," Lexington "L," Lexington "N," Lexington "P," Oconee "A 1," Richland "G," Spartanburg "B," Spartanburg "BB," Spartanburg "CC," Sumter "D" and Sumter "H." Noted Jan. 16, C. D.—

CONTRACTS AWARDED

Calif., Bakersfield—HANGAR, etc.—Kern Co. wood frame hangar and shop building at County Airport, W.P.A. labor, $150,000. C. Biggar, Haberfelde Bldg., archt. Noted Feb. 6, C. D.—Feb. 13, E. N.-R., under "Contracts Awarded."

Calif., Oakland—AIRPORT DEVELOPMENTS—City, Oakland Port Comn., Grove St. Pier, allotted $343,560 by W.P.A. for improvements at airport, involving 200 ft. wide x 2,000 ft. long oil macadam runway, level unimproved section of field, resurfacing 5,000 ft. rd. to radio range station, draining runway and installing 18,000 ft. drain tile, resurfacing 500,000 sq.ft. airport area with quarry rock, reconstructing substructure of wharf at 7th St. outer harbor terminal, $30,000, ocntinuing work uncompleted by SRA; rebuilding 400 ft. dock in north industrial area, $35,000; rehabilitating Clay and Market St. Piers, Quay Wall warehouse, $24,000; reconditioning buildings of commission, $11,592; remodeling offices and changing locations of wind tee, $18,386. An allottment of $306,100 from WPA for additional work is expected, incl. construction of garage for naval reserve; fire main installation and constructing gas tank pit, relocate boundary lights. All work to be undertaken by **W.P.A.** forces. J. G. Bastow, asst. ch. engr., City Port Comn., Grove St. Pier.

Calif., Oakland—WHARF—Taylor Mill Corp., 2211 East 7th St., heavy timber wharf, East 7th St., to Western Industrial Eng. Co., 2201 East 7th St., $25,900.

Calif., Stockton — FREIGHT and BARGE DOCK, etc.—O. R. Chain, general contractor, 41 South Sutter St., electrical work for freight and barge trans-shipment dock, for City Port Dist., to Eddy Electric Co., 309 East Weber St.***plumbing, to Miller-Hays Co., 742 East Weber St.***sheet metal, to Fraser Furnace Co., 444 South San Joaquin St.***steel sash, to W. Zerwick, 521 East Channel St.***concrete, to A. Sandberg, RFD 2, Box 40-D***reinforcing steel, to F. A. Klinger, P. O. Box 757. Noted Mar. 16, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

Conn., Hartford—PARKS—City, R. Hurley, W.P.A. engr., repairing park damaged by flood, **W.P.A.** labor, $197,022. Plans approved. Flood Emergency fund.

Florida—RURAL ELECTRIC POWER LINES—Florida Power Corp., Tallahassee, constructing 184½ mi. rural electric power lines in Alachua, Citrus, Columbia, Gadsden, Hernando, Liberty, Marion, Pasco, Pinellas, Suwanee and Wakulla Counties, separate contracts and day labor with aid of R.E.A. loan. $164,500. Owner will purchase materials.

Kansas—OIL and GAS DEVELOPMENT—Corporation, c/o Frank B. Hamlin, 580 5th Ave., New York, gas and oil development in Russell Co., day labor and separate contracts. Est. $50,000 or more. Owners will purchase materials. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

La., Kaplan—GAS SYSTEM—City, constructing natural gas system to connect with line from United Gas Co., at Abbeville, to J. C. Mongomery, Kaplan, $65,000.

Md., Baltimore—RAILROAD—See "Materials and Equipment."

Mass., Fitchburg—RETAINING WALL—City, R. T. Greenwood, mayor, T. F. Mathews, W.P.A. dir., concrete, stone retaining wall along Nashua River, owner builds by day labor.

Mo., St. Louis—ZOO—Smith-Cooke Constr. Co., general contractors, 4829 Easton Ave., iron work for barless animal units for zoo, for City, c/o Zoological Bd. Control G. P. Vierheller, secy., Primate House, Forest Park, to LaSalle Iron Wks., 3110 LaSalle St.***sheet metal work, to J. Brodden Sheet Metal Wks., 4659 Page St.***roofing, to South St. Louis Slate & Tile Roofing Co., 6147 Manchester Ave.*** repainting, to J. Ward Painting Co., 3110 Easton Ave. **P.W.A.** Noted Mar. 10, C. D.—Mar. 12, E. N.-R., under "Contracts Awarded."

Nev., Pioche — TRANSMISSION LINES — Lincoln County Power Dist., constructing 156 mi. high tension power transmission line, wood poles, H-frame type, to connect substation near Boulder Power Plant with Prince Substation, near here, to W. E. Callahan Constr. Co., 206 South Spring St., Los Angeles, Calif., $109,510. **P.W.A.**. Bids Feb. 5. Noted Jan. 23, C. D.

O., Cleveland—ELECTRICAL SERVICE and FEEDER LINES, etc.—Great Lakes Exposition Co., Terminal Tower, installing electrical service and feeder lines throughout the grounds, service lines will be connected with two sub-stations, one at Lakeside Ave. and East 9th St., the other on Exposition Grounds, to Dingle Clark Co., Engineers Bldg.; and seven-way main entrance 460 ft. long with 70 ft. and four 30 ft. pylons, 2 blocks from the center of the city, to S. W. Emerson Co., 1836 Euclid Ave. Approximately $30,000.

O., Martins Ferry—STADIUM—City, general contract constructing stadium, to Klotz Bros., Martins Ferry, $30,990. **P.W.A.**

Okla., Oklahoma City—GAS and OIL DEVELOPMENT — Corporation, c/o O. Assaus, 510 Northwest 21st St., constructing gas and oil development in Oklahoma City oil fields, day labor and separate contracts. To exceed $50,000. Owner will purchase materials.

Okla., Oklahoma City—GAS PIPE LINE—Sunray Oil Co., 1st Natl. Bank Bldg., constructing 9,100 lin.ft. 8 in. steel pipe line for gas line on 20th St., own forces. $30,000. Private plans.

Oklahoma—OIL and GAS DEVELOPMENT—Corporation, c/o Blair Cunningham, Jr., 317 West Park St., Oklahoma City, constructing oil and gas development, Hanbury Oil Fields, Comanche Co., day labor and separate contracts. To exceed $50,000. Owner purchases materials.

Pa., Hollidaysburg — GAS LINES — Peoples Natural Gas Co., Box 1756, Pittsburgh, repairs and replacements to gas distributing lines, damaged by flood throughout Blair County, day labor, own forces. Est. $50,000. L. Tonkin, c/o owner, engr.

Pa., Titusville—AIRPORT—City, City Hall, developing modern municipal airport on Donavan Farm, west of city line, incl. hangars, runways, administration building, illumination, etc., day labor and supervision of J. M. Fay, city engr. To exceed $23,000. $10,000 allocated by city for preliminary work.

Wash., Vancouver—DOCK and WAREHOUSE—Port of Vancouver, to G. H. Buckler & Co., Lewis Bldg., Portland, Ore., $275,000. Bids Apr. 2, awarded Apr. 2. Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

B. C., Vancouver—PARK IMPROVEMENT—Vancouver Parks Bd., Stanley Park, special improvement to Stanley Park for Jubilee celebrations, incl., electric and fountain in lost lagoon, to Hume & Rumble, 510 West Hastings St., $45,000; new grandstand at oval and miscellaneous work, day labor under supervision of A. S. Wotton, Stanley Park, engr. Total est. $123,000.

MATERIALS AND EQUIPMENT

PROPOSED WORK

ROLLER—**Los Angeles, Calif.**—A. J. Holm, city purch. agt., City Hall, rejected bids Mar. 10, on 3 wheel roller, Buffalo-Springfield Model VM-29 or equal, Spec. 3478. Noted Mar. 18, C. D.

PUMPING ENGINE—**Danvers, Mass.**—Town, E. B. Bachelier, chn. Bd. Selectmen, Town Hall, plans purchasing new pumping engine for Fire Dpt., $5,700. Appropriation granted for same.

FIRE EQUIPMENT—**Cold Spring, Minn.**—Village, F. H. Betz, clk., plans purchasing additional fire equipment, incl. truck and pumper.

SNOW REMOVING EQUIPMENT—**Redwood Falls, Minn.**—Redwood Co., I. R. Rogers, aud., plans purchasing snow removal equipment, motor powered. Authorization may be voted at June election. R. Cook, co. hy. engr.

STEEL TANK—**St. Louis, Mo.**—A. J. Getz, 1729 North 11th St., granted permit to install one 1,000 gal. underground steel tank for gasoline for private use, 1720 North 11th St.

STEEL TANKS—**St. Louis, Mo.**—S. Simon, c/o 2100 Market St., applied for permit construct three 550 gal. underground steel tanks for use in automobile service station, 2100 Market St.

STEEL TANKS — **St. Louis, Mo.** — Regina Strauss, c/o 1431 Louisville Ave., granted permit to install three 550 gal. underground steel tanks for gasoline, at 1431 Louisville Ave.

TANK—**St. Louis, Mo.**—H. Blase, 7932-34 North Bway., granted permit to install one 550 gal. and two 1,000 gal. underground steel tanks for gasoline for automobile service station, 7932 and 7934 North Bway.

TANK—**St. Louis, Mo.**—A. R. Miller, c/o 3445 Hampton Ave., granted permit to install two 560 gal. underground steel tanks for gasoline for automobile service station, 3445 Hampton Ave.

TANKS — **St. Louis, Mo.** — Skelgas Co., 28 North Central Ave., Clayton, applied to Bd. P. Serv., for permit to install three 6,000 gal. underground steel tanks for storage, 39th St. and Chouteau Ave.

TANKS—**Buffalo, N. Y.**—C. A. Cyphers, 15 Bradley St., plans installing 500 gal. steel tanks, electric pump, etc., at service station, 15 Bradley St. To exceed $1,000.

STEEL TANKS, etc.—**Jamestown, N. Y.**—Richfield Oil Corp., Fluvanna Ave. ext., Jamestown, plans installing 500 gal. steel tanks, electric pump, air compressor, etc., in modern superservice station, 5th and Main Sts. To exceed $1,000.

MOTOR TRUCKS—**Niagara Falls, N. Y.**—City, W. D. Robbins, mgr., plans purchasing fleet motor trucks for Street Dpt. H. Wesley Clark, city engr.

SEWER PIPE, etc.—**Olean, N. Y.**—City, City Hall, soon takes bids 24 in. c.i. pipe and connections for proposed sewer extension. $3,300. G. Miles, city engr.

TRUCK — **Syracuse, N. Y.** — Silver Trucking Co., 227 Leon St., plans purchasing new 5 ton cab and enclosed body truck. $2,000.

†Federal Government

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Materials, etc. (Continued)

STORAGE TANK — Utica, N. Y. — Colonial Beacon Oil Co., 34 Rockefeller Plaza, New York, plans purchasing 1,000 gal. gasoline storage tank at service station, Bradford Rd. and Riverside Dr. To exceed $1,000.

FIRE FIGHTING EQUIPMENT — Tamaqua, Pa.—Citizens Volunteer Fire Co., Tamaqua, plans purchasing new fire truck, combination pumper and hose unit. $3,000.

ASPHALT PLANT EQUIPMENT and STEAM ROLLER—Sarnia, Ont.—Bd. Wks., J. Newton, com., plans equipping asphalt plant and also purchase steam roller. Interested in prices and information.

ELECTRIC POWER — Wawa, Ont. — Wawa Goldfields Ltd., A. C. Melkman, mgr., plans replacing present Diesel equipment in mine mill with electric power during summer.

BIDS ASKED

STEEL PIPE, etc.—Antioch, Calif.—J. McElheney, city clk., taking bids lap welded steel pipe and fittings and for a suction line and electrically driven centrifugal pump for municipal waterworks pumping plant. G. Olliver, city engr.

SYNCHRONOUS MOTORS — Los Angeles, Calif.—May 12 (extended date), Directors Metropolitan Water Dist., F. E. Weymouth, engr., 306 West 3rd St., synchronous motors for main line pumping plants, Spec. 153, (1) for intake and Gene plants, 6 motors, 6700 KW output, 9,000 hp. ea., (2) for Iron Mountain plant, 3 motors, 3,200 KW output, 4300 hp. ea., (3) for Eagle Mountain and Hayfield Plants, 6 motors 9,300 KW output, 12,500 hp. each. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

†**DUMP TRUCKS — San Francisco, Calif.** — Procurement Officer, Forest Service, 916 Phelan Bldg., taking bids seven 1½ yd. hydraulic operated steel dump bodies complete with hoists, power take-off, etc.

EMULSIFIED ASPHALT—Hartford, Conn.—Apr. 28, by Bd. Contr. & Supply, at office of Mayor, 100,000 gal. emulsified asphalt.

†**FENCING MATERIAL, etc.—Wash., D. C.** —Apr. 27, at office Purchasing Officer, Wash., D. C., fencing material, pig iron, pig lead, machine bolts, nuts, steel rivets, screws, expansion shields, c.i. and steel washers, locker washers, drill steel, junction boxes, pit lighting fixtures, dry metallic brown, etc.

LIGHT and POWER HOUSE EQUIPMENT—Decatur, Ind.—May 7, by Bd. P. Wks., A. R. Holthouse, mayor, 2,000 kw.-hr. turbine, condenser, exciter, switchboard. $60,000. P.W.A. project. Bevington-Williams, Inc., 1139 Indiana Pythian Bldg., Indianapolis, engrs.

GRAVEL—Grundy Center, Ia.—May 18, by Grundy Co., furnishing 32,250 cu.yd. Class B gravel on county highways, to be used for 24.5 mi. new surfacing and repair work.

CORRUGATED PIPE, etc.—Colfax, La.—June 17, by Nineteenth Levee Dist., Colfax, 160 lin. ft. 24 in. corrugated pipe, 5 corrugated metal diaphragms, 1 automatic flood gate, 7 two ft. jointing bands. State Bd. Engineers, New Orleans, engrs.

†**DRILL RODS—Eastport, Me.**—Apr. 27, by U. S. Eng., twenty-eight 4 to 16 ft. drill rods, hollow, 1¼ in. diam., round with Leyner type lugged shank, f.o.b. Eastport.

†**AIR COMPRESSOR—Boston, Mass.**—Yards & Docks, Navy Dpt., Wash., D. C., taking bids 5,000 cu.ft. per min. air compressor at Navy Yard, Spec. 8012. (Date not set.)

†**RUST PREVENTATIVE COMPOUND, etc. —Boston, Mass.**—Apr. 28, by Bureau Supplies & Accounts, Wash., D. C., rust preventative compound, revolution counters, steel valves, bus equipment, switches: May 1, nickel steel bars for Boston Navy Yard.

PUMPING ENGINE—Lynn, Mass.—Apr. 28, by City, Purchasing Dpt., City Clerk, City Hall, 1 triple combination pumping engine and equipment, 750 gal. capacity, for Fire Dept.

†**CYPRESS FLOORING, etc.—Vicksburg, Miss.** —May 1, by U. S. Eng., 15,000 ft. B.M. cypress flooring, f.o.b. Vicksburg.

†**GENERATING SET—Vicksburg, Miss.**—May 14, by U. S. Eng., Box 667, Vicksburg, diesel engine driven electrical generating set, 110 volts, d.c., f.o.b. Greenville.

†**SOUTHERN YELLOW PINE — Vicksburg, Miss.**—May 11, by U. S. Eng., P. O. Box 667, Vicksburg, 23,340 ft. B.M. dense long leaf southern yellow pine.

†**WIRE NAILS—Vicksburg, Miss.**—May 11, by U. S. Eng., P. O. Box 667, Vicksburg, common wire nails, in kegs of 100 lb. each, f.o.b. Vicksburg.

†**STEEL SHEETS, etc.—Kansas City, Mo.**—Apr. 29, by U. S. Eng., 232 Mfg. Exchange Bldg., steel sheets, bars, angles and plates. $1,500.

†**STEEL REINFORCING BARS—Fort Peck, Mont.**—Apr. 30, by U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, Mo., 5,995,000 lb. steel reinforcing bars for Fort Peck Tunnel Outlet and main control shafts, for Fort Peck Dam. $90,000.

†**TRANSFORMERS—Boulder City, Nev.**—May 18, by Bureau Reclamation, Denver, Colo., furnishing four 55,000 k.v.a. 60 cycle, single phase water cooled 16,400 to 132,950/230,000 volt Y transformers for installation in Boulder Power Plant.

ASPHALTIC OIL, etc.—Trenton, N. J.—May 5, by Hamilton Twp. Com., 2090 Greenwood Ave., 90,000 gal. asphaltic oil, 35,000 gal. tar, Grade B-3 of UB-3, 3,000 gal. KPI or UC-1, 3,000 tons UC-1 sand. J. L. O'Rourke, 317 Park Ave., engr.

STORAGE TANK—Buffalo, N. Y.—Hambleton Terminals Corp., 46 Skillen St., Buffalo, E. Gabriel, 1107 Bailey Ave., Buffalo, in charge will purchase at once 1,000 gal. steel gasoline storage tank for service station, at Niagara St. and Bird Ave. To exceed $1,000.

PIPE, etc.—Westfield, N. Y.—See "Contracts Awarded."

COLD MIX, etc.—Cleveland, O.—Apr. 28 by Bd. Comrs. Cuyahoga Co., 6,000 gal. cold mix, 46,000 gal. M.T. 2, 280 tons asphalt powder.

ROAD MAINTAINERS—Cleveland, O.—Apr. 28, by Bd. Comrs. Cuyahoga Co., 2 road maintainers, $1,000 each.

FIRE FIGHTING EQUIPMENT — Hanover, Pa.—Hanover Twp. Bd. taking bids furnishing fire pumper truck with booster tank for Preston Fire Dist., also plans purchasing small gasoline power pump to drain surface waters. $2,900. J. Langan, Town Hall, engr.

FIRE HOSE—Kutztown, Pa.—May 4, by Boro Secretary, supplying various fire fighting equipment, incl. 1,000 ft. 2½ in. fire hose, $1,000 or more.

DUMP TRUCK—Pittsburgh, Pa.—W. N. McNair, mayor, authorized to seek bids on dump truck for Hy. Dpt., for City, Dpt. Supplies. To exceed $1,000.

ASH HOISTS, LAWN MOWER, etc.—Wilkinsburg, Pa.—May 7, by Wilkinsburg School Dist., furnishing 2 ash hoists, 60 in. power operated lawn mower, 2 boiler feed pumps, paint, 500 bleacher seats, cement, flagpoles, hardware supplies. H. R. Shweinberg, secy. To exceed $11,000.

†**OPERATING MACHINERY — Knoxville, Tenn.**—May 1, by Tennessee Valley Authority, Knoxville, operating machinery for lock gates and segmental valves and outrigger, snatch block and sheave assemblies for hauling winches for Pickwick Landing Lock. C. H. Garity, dir. Purchases.

GRAVEL — Hartland, Wis. — May 4, by W. Pantz, town clk., 5,000 to 6,000 yd. crushed gravel.

ROAD OIL—Marshfield, Wis.—Apr. 30, by City, furnishing 5 carloads road oil.

STEEL TANKS—Montreal, Que.—H. Larogue, 244 Notre Dame St. W., in market for two 500 gal. gasoline tanks.

STEEL TANKS, etc. — Quebec City, Que. — P. L. Lortie Ltd., 73 St. Vallier St., in market for two 1,000 gal. gasoline tanks and 2 gasoline pumps.

STEEL TANKS, etc.—Quebec City, Que.—Wilfrid Cloutier, 112 Church St., in market for 500 gal. gasoline tank and a gasoline pump.

CONTRACTS AWARDED

†**CORRUGATED METAL PIPE and DRAINAGE GATES, etc.—Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., corrugated metal pipe and drainage gates, to Western Pipe & Steel Co., 5717 Santa Fe Ave., $7,240; wire fabric, to Consolidated Steel Co., 6500 East Slauson Ave., $484. Bids Apr. 13. Noted Apr. 7, C. D.

†**METAL PIPE, etc.—Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., furnishing corrugated metal pipe, drainage gates, Proposal 542, to California Corrugated Culvert Co., 409 LeRoy St., $14,579; steel and wood box forms, Schedule 8264, to Consolidated Steel Corp., 6500 East Slauson St., $10,200. Bids Apr. 3. Awarded Apr. 11.

†**METAL PIPE, etc.—Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., corrugated metal pipe and discharge gates to Western Pipe & Stele Co., 5717 Santa Fe Ave., $16,328. Bids Mar. 31. Noted Apr. 6, C. D.

†**MISCELLANEOUS FENCING—Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., miscellaneous fencing, Proposal 538, to Standard Fence Co., 3020 San Fernando Rd., $5,727. Bids Apr. 2, awarded Apr. 9.

MOTOR GENERATOR SET—Los Angeles, Calif.—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., one 300 kw., 550 V.D.C. motor generator set for operation on 5,000 V. 60 cycle, 3 phase source, 1 set as above so designed that at future date motor windings may be connected for operation at 2,300 V. 60 cycles and generator may be converted at minimum cost into 250 V.D.C., Spec. 1885, f.o.b. Los Angeles, to Ideal Electric & Mfg. Co., 425 East Pico Blvd., $6,995. Bids Mar. 18, awarded Apr. 7. Noted Feb. 28, C. D. —Mar. 5, E. N.-R.

MUCK CARS — Los Angeles, Calif. — S. A. Joseph, purch. agt. Metropolitan Water Dist., 306 West 3rd St., 15 steel muck cars, Spec. E-224, except for special couplers, specified. Bid 56563, to Koppel Industrial & Equipment Co., Koppel, Pa., $6,803; 15 steel muck cars, Bid 56297, to Madsden Iron Wks., 5631 Bickett St., Huntington Park, $7,605. Bids Apr. 4, awarded Apr. 8. Noted Apr. 3, C. D.

†**PUMP and MOTOR, etc.—Los Angeles, Calif.** —Indian Irrigation Service, 751 South Figueroa St., Los Angeles, furnishing pump, motor, control equipment and accessories for pumping plant, at Flathead Irrigation Project, Mont., to Fairbanks-Morse Co., 2401 Santa Fe Ave., $4,515. Bids Mar. 26. Noted Apr. 2, C. D.

†**STEEL ANGLES, etc.—Los Angeles, Calif.** —U. S. Eng., 751 South Figueroa St., steel angles and sheet steel, Proposal 541, to Los Angeles Iron & Steel Co., 1522 Santa Fe Ave., 8706; wire rope, Proposal 540, to Crook Co., 2900 Santa Fe Ave., $2,650. Bids Apr. 3.

STRAIN CLAMPS, etc.—Los Angeles, Calif.—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., miscellaneous strain clamps, bus clamps, anchor shackles, insulators, etc., Spec. 1916, to Ohio Brass Co., 417 South Hill St., $4,330. Bids Apr. 1, awarded Apr. 7.

†**TURBINE PUMP—Los Angeles, Calif.**—U. S. Indian Irrigation Dist., 751 South Figueroa St., 1 turbine pump, deepwell, 1,200 g.p.m., 2 speed motor, and turbine pump 200 g.p.m., with 1 speed motor, to Pomona Pump Co., 406 South Main St., $1,606. Est. exceds $1,000. Bids Mar. 31.

BACK HOE ATTACHMENT—Oakland, Calif. —J. H. Kimball, secy. East Bay Municipal Utility Dist., 512 16th St., 1 back hoe attachment for "General" ½ cu.yd. shovel Inf. Prop. 733, to Spears-Wells Mchy. Co., 1832 9th St., Oakland, $2,230 rebuilt machine. Bids Apr. 3. Awarded Apr. 10. Noted Mar. 27, C. D.

CAST IRON PIPE—Pasadena, Calif.—City Clerk, 24,000 ft. 6 in. and 10,000 ft. 8 in. c.i. pipe, to National Cast Iron Pipe Co., 625 Southwestern Ave., Los Angeles, $26,860. Bids Apr. 3, awarded Apr. 7. Noted Apr. 9, C. D.

TRANSFORMERS—Pasadena, Calif.—Clerk, City Dpt. Power & Light, City Hall, 2 transformers, rated 9,000 kva. self-cooled, 12,000 kva. auxiliary air blast, 3 phase 60 cycle, oil insulated inert gas type, surge proof, outdoor, normal voltage, 33,500 high side, 16,500 low side, to Allis-Chalmers Mfg. Co., 458 South Spring St., Los Angeles, $60,300. Est. $30,000. Bids Mar. 18. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

ELECTRICAL CONDUIT—Petaluma, Calif.—G. V. Roberts, 4,620 lin.ft. electrical conduit, inside diameter 1¼ in., and 17 combination isolating transformers and disconnecting potheads, to Westinghouse Electric Supply Co., 260 5th St., San Francisco, 15.39c. per lin.ft. and $27.54 each respectively; 6,368 lin.ft. B and S ga. Hazard 3500 electric cable, single copper conductor, to Baugh & Liddle, Petaluma, $0.00983 per ft. Noted Apr. 13, C. D.—Apr. 9, E. N.-R.

DEEP WELL PUMP—Whittier, Calif.—City Clerk, one deep well pump, 4,000 g.p.m. against 50 ft. head, to Wintroath Pump Co., 1100 South Meridian St., Alhambra, $1,088; one 80 to 90 hp. heavy duty, stationary gas engine to drive above pump, to Worthington Co., 5075 Santa Fe Ave., Los Angeles, $5,603. Bids Mar. 23, awarded Apr. 7. Noted Mar. 19, C. D.

SHEET IRON—Pontiac, Ill.—Dpt. Purchase & Finance, Springfield, sheet iron, for Pontiac Branch State Penitentiary to J. T. Ryerson & Son, Inc., 16th and Rockwell Sts., Chicago, $1,983. Bids Mar. 16.

CONTROLLER UNITS — Springfield, Ill. — Dpt. Purchase & Supply, State Dpt. P. Wks. & Bldgs., Springfield, controller units for state highways, delivery at River Forest, to Automatic Signal Corp., 400 North Michigan Ave., Chicago, $3,074. Bids Feb. 3.

GRADER BLADES—Springfield, Ill.—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, grader blades, to Austin Western Road Mchry. Co., 601 Farnsworth Rd., Aurora, $3,077. Bids Feb. 25. Noted Feb. 21, C. D.

ROAD GRAVEL—Harlan, Ia.—Shelby Co., C. Brodersen, aud., 18,000 tons Class A road gravel, f.o.b. Korley, Kirkman and Panama, to Northwestern Gravel Co., and to LeGrand Limestone Co., Lakeview, $21,858. Bids Apr. 6.

LUMBER—Toledo, Ia.—Tama Co., 116,000 ft. B.M. untreated lumber and 2,986 lin.ft. creosoted piling, to Central State Bridge Lumber & Supply Co., Fort Madison, $5,355. Awarded Apr. 6.

PUMP, etc.—Owensboro, Ky.—At office of C. T. Smith, clk., City Hall, horizontal centrifugal high service pump for municipal waterworks, to Dayton-Dowd Co., Quincy, Ill., $751; motor and control, to Westinghouse Electric Supply Co., East Pittsburgh, $2,188. Prices do not include installation. Bids Apr. 8. Noted Mar. 31, C. D.—Apr. 9, E. N.-R.

†**GENERATING UNIT—Eastport, Me.**—U. S. Eng., one 60 kw. gasoline driven generator unit, to Buffalo Gasoline Motor Co., 1280 Niagara St., Buffalo, N. Y., $4,020. Bids Mar. 27, awarded Apr. 16. Noted Mar. 23, C. D.

CAST IRON WATER PIPE—Portland, Me.—City, J. E. Barlow, city mgr., Portland Water Dist., 16 Casco St., 2,600 ft. 8 in. c.i. water pipe, to R. D. Wood Co., 400 Chestnut St., Phila., Pa., at $1.03 per ft. Bids Mar. 24, awarded Apr. 7. Noted Mar. 26, C. D.—Apr. 2, E. N.-R.

★ **STEEL RAILS—Baltimore, Md.**—Baltimore & Ohio R.R., Baltimore and Charles Sts., W. S. Galloway, purch. agt. (H. G. Lane, ch. engr.), 15,000 tons steel rails, to Carnegie Illinois Steel Co., Carnegie Bldg., Pittsburgh, Pa.***8,400 tons, to Bethlehem Steel Co., Bethlehem, Pa.***1,000 tons, to Inland Steel Co., 38 South Dearborn St., Chicago, Ill. Est. $825,000. Owners will place rail by day labor.

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†*Federal Government*

Materials, etc. (Continued)

BITUMINOUS PATCHING MATERIAL, etc.—**Boston, Mass.**—City, Supply Dpt., D. F. Doherty, supt., City Hall Annex, furnishing bituminous patching mixture to Street Dpt., to Trimount Bituminous Products Co., 1840 Parkway, Everett, approximately $8,180; furnishing traffic paint to Traffic Dpt., to Sherwin, Williams Co., 19 Pittsburgh St., various prices per gal.

COMPOSITION CASTINGS—Boston, Mass.—City, Supply Dpt., D. F. Doherty, composition castings to Water Dpt., to Nathan Mfg. Co., 250 Park Ave., New York, $9,380. Bids Mar. 24, awarded Apr. 9.

†**PUMP CASING**, etc.—**Boston, Mass.**—U. S. Eng., Custom House, furnishing pump casing, etc., for main dredging pump on U. S. Dredge Minquas, Circular 61, Item 1, to National Erie Corp., Erie, Pa., $1,687; Item 2, to Hardie Tynes Mfg. Co., Birmingham, Ala., $840. Bids Mar. 10, awarded Apr. 7. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

ASPHALTIC SAND, etc.—**Minneapolis, Minn.**—City, to Hedberg-Freidheim & Co., and Century Washed Sand & Gravel Co., St. Louis Park, 45,000 tons asphaltic sand at 60c. per ton*** to Aggregate Sales Assn., 610 Baker Bldg., Minneapolis, 20,000 tons concrete sand at 70c. per ton; 25,000 tons gravel, 1.40 per ton*** to Trap Rock Co., 1128 Plymouth Bldg., 25,000 tons trap rock at $1.50 to $2.50 per ton; 2,500 tons asphaltic seal coat at $2.50 per ton; 40,000 tons asphaltic binder at $1.50 to $1.65 per ton; to Industrial Aggregate Corp., 116 South 6th St., 50,000 tons asphaltic wearing surface, $1.35 per ton. Bids Mar. 30. Noted Mar. 26, C. D.

TRACTORS—Minneapolis, Minn.—City, two 10 ton caterpillar tractors for Engineering Dpt., to W. H. Ziegler, 2331 University Ave. S.E., $5,814 each. Bids Apr. 1. Noted Mar. 26, C. D.

TRUCKS—Red Wing, Minn.—City, S. T. Irvine, clk., 3 new trucks, to Pioneer Garage, Red Wing, $2,218; 1 truck to C. J. Ahlers & Co., Red Wing, $833. Bids Mar. 24.

BITUMINOUS ROAD OIL, etc.—**Winona, Minn.**—City, G. W. Hofman, recdr., 70,000 or more gal. bituminous road oil, to Standard Oil Co., Front and Kansas Sts., Winona, 5.3c. per gal.; 20,000 gal. or more cutback asphalt, to Socony Vacuum Co., 26 Bway., New York, N. Y., 6.91c. per gal. Bids Mar. 30. Noted Mar. 20, C. D.

†**WIRE MESH—Kansas City, Mo.**—U. S. Eng., 232 Mfg. Exch. Bldg., Kansas City, 570,000 sq.ft. wire mesh to Keystone Steel & Wire Co., Peoria, Ill., $2,166. Bids Apr. 6, awarded Apr. 8. Noted Apr. 14, C. D.

TRUCKS FOR RAMP FLOORS—St. Louis, Mo.—Bd. P. Service, City Hall, furnishing, delivering heavy duty trucks for ramp floors at St. Louis Municipal auditorium and community center, 15th and Market Sts., to Mississippi Valley Structural Steel Co., 3117 Big Bend Blvd., Maplewood, $3,020. **P.W.A.** Bids Apr. 3. Noted Mar. 30, C. D.

†**PIPE—New York, N. Y.**—Treas. Dpt. Procurement Div., 76 9th Ave., 340 tons 6- to 8-in. c.i. pipe, to Warren Pipe & Fdry Co., Phillipsburg, N. J.

PAVING MATERIALS—Syracuse, N. Y.—Bd. Contr. & Supply, City Hall, to Barrett Corp., Erie Blvd., 3,500 tons bituminous macadam mixing method Type 5 and cold patch at $4.70 per ton; 200,000 gal. cold application bituminous material 11.4c. per gal., f.o.b. plant; 50,000 gal. hot application at 11.7c. delivered; 1,000 cutback material 13.75c. per gal.; 15,000 gal. T penetration material 11.7c. per gal.

PIPE, etc.—**Westfield, N. Y.**—S. Ross, Greystone Lodge, Westfield, 450 ft. 10 in. steel pipe, collars, etc., to Bradford Supply Co., Bradford, Pa. Est. $1,000. Owner takes bids about May 1 for furnishing 1,900-2,000 ft. 6¼ in. steel pipe and connections. Noted Mar. 25, C. D.—Apr. 2, E. N.-R.

REINFORCING STEEL, etc.—**Raleigh, N. C.**—Div. Purchase & Contr., 256,089 lb. reinforcing steel, f.o.b. Raleigh, to Easterby & Mumaw, P. O. Box 1295, Charlotte, $6,219***432 twenty ft. lengths miscellaneous steel, to Dillon Supply Co., 216 South West St., $1,504***200 dozen No. 3, hollow back, long and short handled shovels, to Monroe Hardware Co., Monroe, $2,716***one hundred 55 gal. drums 80/20 creosote coal tar solution, to Eastern Tar Products Co., Baltimore, Md., $850***3,500 chain grab hooks, 3,500 cold shuts, and 3 casks ¾ in. proof coil chain, to American Hardware & Equipment Co., 217 West 1st St., Charlotte, $611***6,000 galvannealed steel sheets, to Carolina Hardware Co., approximately $2,000*** crusher saws, f.o.b. Craggy, to E. F. Craven Co., Greensboro, $8,070***1,000 gal. black traffic line paint in 55 gal. drums and in 5 gal. containers, to Sherwin-Williams Co., Delaware Ave. and Chestnut St., Phila., Pa., $635***7,714 bd. ft. and 690 lin. ft. creosoted timber, to Wood Preserving Co., Up. King St., Charleston, S. C., $875***roofing materials to Budd Paper Roofing Co., Durham, $654. Grand total $24,134. Bids Apr. 2. Div. Purchase & Contr., furnishing 50,000 gal. lubricating oil SAE 20-30-40-50-60, to Atlantic Refining Co., 260 South Broad St., Phila., Pa.; oxygen and acetylene, to Air Reduction Sales Co., P. O. Box 1147, Charlotte. Noted Mar. 30, C. D.

†**SWITCHGEAR—Portland, Ore.**—U. S. Eng., Custom House, furnishing 2,400 volt metal clad switches for Bonneville Dam, to General Electric Co., River Rd., Schenectady, N. Y., $77,285. Noted Mar. 20, C. D.—Mar. 5, E. N.-R.

BITUMINOUS MATERIALS—Harrisburg, Pa.—Commonwealth of Pennsylvania, bituminous materials f.o.b. various points, to York Valite Co., York, $1,141 and to Chambersburg Stone Co., Chambersburg, $1,274.

TRUCK, CHASSIS, etc.—**Warren, Pa.**—Boro Council, truck chassis, to General Motors Truck Co., Buffalo, N. Y., $875; 500 gal. centrifugal pump, to American Steam Pump Co., Pittsburgh, $800. Est. $2,800. Noted Mar. 6, C. D. Mar. 12, E. N.-R.

†**CRANES—Charleston, S. C.**—Yards & Docks, Navy Dpt., Wash., D. C., bridge and wall cranes at Navy Yard, Spec. 8132, to Harnischfegen Sales Corp., 4400 West National Ave., Milwaukee, Wis., $31,690. Bids Apr. 13, C. D.—Mar. 26, E. N.-R.

†**CEMENT—Beverly, Tex.**—Lower Colorado River Authority, Beverly and Bluffton, supplying 20,000 bbl. standard bulk cement; 5,000 bbl. standard sack cement; 340,000 bbl. modified sack cement, to Republic Portland Cement Co., Smith Young Tower, San Antonio, $385.-159. Awarded Apr. 9.

RAILS—Seattle, Wash.—City Railway, County-City Bldg., A. E. Pierce, supt., 50 gross tons 60 lb. rail in 62 ft. lengths, to Bethlehem Steel Corp., Youngstown St., $2,623. Bids Apr. 2, awarded Apr. 6. Noted Apr. 10, C. D.—Apr. 16, E. N.-R.

PIPE — Spokane, Wash. — City Water Dpt., City Hall, 3,000 ft. 6 in. c.i. pipe, to Hughes & Co., South 119 Howard Ave., $2,340. Awarded Apr. 4.

DIESEL ENGINE, AIR COMPRESSOR, etc.—**Edgerton, Wis.**—City, furnishing diesel engine, air compressor, centrifugal pumps, to Fairbanks Morse & Co., 404 North Plankington Ave., Milwaukee, $8,347. Bids Mar 2. Noted Mar 13, C. D.—Mar. 19, E. N.-R.

PIPE—Kenosha, Wis.—City, 1,500 ft. 6 in. and 900 ft. 4 in. Class B bell and spigot c.i. pipe, to Lynchburg Fdry. Co., Lynchburg, Va., $1,395. Bids Mar. 27.

†**PORTLAND CEMENT**, etc.—**Madison, Wis.**—Treas. Dpt. Procurement Div., 300 bbl. portland cement f.o.b. municipal garage, Shorewood, to J. Druecker & Son, 1325 East Capitol Dr., $510***materials for sprinkler system, to Milwaukee Plumbing & Heating Supply Co., 715 West Clybourn St., Milwaukee, $795*** lumber delivered to North 35th and West Congress Sts., Milwaukee, to Mid City Lumber Co., 6022 West States St., Milwaukee, $472*** 230 bags gold colored cement, to W. H. Pipkorn Co., 1548 West Bruce St., Milwaukee, $3.50 per bags disc. 5-10***72 cu.yd. washed torpedo sand delivered to 2450 South 60th St., West Allis, to Brookfield Sand & Gravel Co., West Burleigh Rd., Milwaukee, $1.65***62 cu.yd. washed No. 2 stone, to Lake Shore Sand & Gravel Co., 1056 West Canal St., Milwaukee at $1.55***75 cu.yd. washed No. 1 stone, to Hermon Luebke Co., 3431 West Forest Home Ave., Milwaukee, $1.55***500 cu.yd. No. 2 washed crushed limestone delivered to South 62nd and West Lapham Sts., West Allis, to Central Sand Gravel & Supply Co., Chestnut St. and North Lovers Lane Rd., Milwaukee, $1.55***200 cu.yd. washed ¼ in. stone chips, to N. J. Pipkorn, 2244 North Humboldt Ave., Milwaukee, $1.80***20 cu.yd. ¼ in. chips, to Cities Fuel & Supply Co., 6639 West National Ave., West Allis, $1.80, all for W.P.A. projects.

†**WASHED GRAVEL**, etc.—**Madison, Wis.**—Treas. Dpt., Procurement Div., 217.5 tons washed gravel No. 2, to Ische Sand & Gravel Co., North Green Bay Ave., Milwaukee, $1.25 per ton***217.5 tons washed torpedo sand, to Northern Gravel Co., West Bend, $1.18***nails, etc., for Milwaukee Institutions, to Badger Paint & Hardware Stores, Inc., 5001 West State St., Milwaukee, $168***5,280 bd. ft. 2x6x16 select white pine delivered to North 35th and West Congress Sts., Milwaukee, to North Side Lumber & Fuel Co., 1014 East Chambers St., Milwaukee, $83 per 1,000***200 bbl. portland cement in paper bags, to Tews Lime & Cement Co., 1136 East North Ave., Milwaukee, $2.30 per bbl.***200 bbl. portland cement in paper bags delivered at Brown Deer Park, Milwaukee, to Pipkorn-Waller Fuel & Supply Co., 7734 Harwood Ave., Wauwatosa, $2.50 per bbl.*** 27.21 bd. ft. lumber delivered in Brown Deer Park, Milwaukee, to John Eller Lumber Co., 3016 West Chamber St., Milwaukee, $28.40 per 1,000, all for W.P.A. projects.

†**CABLE**, etc.—**Milwaukee, Wis.**—Treas. Dpt. Procurement Div., cable, Greenfield Park, to Habirshaw Cable & Wire Co., 40 Wall St., New York, $790***260 cu.yd. quarry stone, South 61st St. and West Grand Ave., West Allis to Central Sand & Gravel Supply Co., West Chestnut St., and Lovers Lane Rd., Milwaukee, $780 ***500 ft. No. 6 and 500 ft. No. 3/0 AWG, 3 conduit, 600 volt, 30% rubber and lead cable to Westinghouse Electric Supply Co., 546 North Bway., 22.138 c. and 72.88 c. per ft. respectively, all for W.P.A. projects.

†**DYNAMITE**, etc.—**Milwaukee, Wis.**—U. S. Forest Service, dynamite, to Trojan Powder Co., Allentown, Pa., $3,501***to Nehring Electric Wks., DeKalb, Ill., 268 mi. Copper covered wire, $4,581***to Central Supply Co., 312 South 3rd St., Minneapolis, Minn., pipe and fittings, $763***to Ellsworth Pipe & Supply Co., 1739 West St. Paul Ave., overhead irrigation lines, $1,486; pipe and fittings, $1,373; overhead irrigation system, $742***to March Auto Irrigation Co., Muskegon, Mich., 4,200 spray nozzles, $41; hangers, $118; turning motors, $363***to Bohman & Sons, explosives, $1,667 ***to G. F. Wright Steel & Wire Co., Worcester, Mass., 212,000 sq.ft. wire cloth, $4,675*** to C. Bruning Co., Inc., 739 North Bway., blue sections, $1,122***to Darrow Bros., Fond du Lac, 300 milk cans, $893. Grand total $21,595. Awarded Apr. 3.

†**HOSE**, etc.—**Milwaukee, Wis.**—U. S. Forest Service, 20,000 ft. hose and hoist for Cleveland 25 tractor, to Hunter Tractor & Mchy. Co., 327 South 16th St., $4,750 and $960 respectively ***432 mi. copper covered wire, to Phelps Dodge Copper Products Co., 40 Wall St., New York, N. Y., $6,650***hoist for caterpillar tractor, to Nagle-Hart Tractor & Equipment Co., 2015 West St. Paul Ave., $510***concrete mixer, to Cunningham-Portmayer Co., 429 West Michigan St., $441. Grand total $13,311. Awarded Apr. 9.

WATER METERS — Transcona, Man. — Municipality, 100 water meters, to Walsh & Clarke, Winnepeg, $11,800; and 100, to MacKay Norton Co., Winnipeg, $10,500.

HEATER — Winnipeg, Man. — Chairman P. Utilities Com., supplying heater at hydro-steam plant, to Superheater Co. Ltd., Winnipeg, $6,000. Noted Oct. 28, C. D.—Oct. 31, E. N.-R.

POWER MAINTAINER — Atwood, Ont. — H. A. MacCourt, clk. Elma Twp., power maintainer, to J. D. Adams Ltd., Paris, $3,600.

STONE — Cayuga, Ont. — Haldimand Co., quarrying, crushing and screening 10,000 tons stone for road building, to Norman E. Foxwell, Dunnville.

GRAVEL—Guelph Twp., Ont.—Guelph Twp. supplying, crushing and delivering at least 6,000 cu.yd. of gravel for township roads, to John McLaren, Rockwood, at 45c. per yd. Est. $3,000.

LIQUID ASPHALT, SAND, GRAVEL, etc.—**Stamford Twp., Ont.**—M. F. Kerr, twp. engr., 1810 Ferry St. Niagara Falls, road material for 1936, application of liquid asphalt and stone, to John Pirson, Stevensville and Walker Bros. Ltd., Thorold***sand, to Braas Bros., Portage Rd., Stamford Twp.***cement, to Edward Weightman, Chippawa***gravel and fill, to Bensen & Patterson, Stamford and Geo. W. Mauley, 511 Ellis St., Niagara Falls***motor oils, to Imperial Oil Ltd., Buttery St., Niagara Falls***liquid asphalt, to Frank Frantz, 1788 Mauland Ave., Niagara Falls. Noted Apr. 2, C. D.

FOREIGN

Australia, Canberra—Federal Government appropriates $35,000,000 for 1936 construction of gun emplacements at head of Sidney Harbor, on Rottnes Island, West Australia, and on Moreton Island, Queensland, for Ministry of Public Works***Ministry of Defense will purchase airplanes.

Australia, Sydney—State Government making plans constructing 6 mi. railroad between Sutherland and Cromwell, $1,500,000 voted; also making plans railroad between Sandy Hollow and Maryvale.

Egypt, Cairo—June 9, by Director General Mechanical & Electrical Div., Ministry of Public Wks., supplying, erecting, placing in commission in perfect working order at A&f power station additional unit, comprising 2 boilers, 1 turbo-alternator set of 5,000 kw. complete with all auxiliaries, switchgear and transformers, 2 turbo-alternators, etc., and erecting necessary buildings. Copies of conditions of tenders specifications, etc., from Egyptian Legation, Wash., D. C., or nearest Egyptian Consulate General.

England—Unit Construction Co. Ltd., **Hunts Cross**, plans townsite development, $2,000,000 ***Lancashire County Council Medical Hospital, **Ormskirk**, making plans new hospital, $5,500,000 voted***Savoy Cinema Ltd., **Ilford**, making plans theatre, $500,000***Norwich, Stewart-Hellesdon Hospital in market for 1 hand feed planing and surfacing machine to take timber 12 in. wide complete with independent electric motor and starter; one circular saw bench with rising and falling table to take maximum depth of 7 in. together with electric motor and starter.

England—Trowbridge County Council of Wiltshire voted $565,000 for new county offices*** **Speke** Municipality approves $12,000,000 for constructing 6,000 houses on 1,500 acre site just purchased.

England, Birmingham—Goodwin & Co. Ltd., 107 Lionel St., in market for naphthalene in 25 ton lots, large flake, pure white, packed in double bags of 100 kilos and prices should be quoted c.i.f. Greek or Turkish ports.

India—Calcutta Port Commissioners awarded contract constructing Howrah Bridge over Hooghi River, to Cleveland Bridge & Eng. Co., Ltd., Darlington, England, Rendel, Painer & Trittan, Westminster, London, engrs.***May 2, by Director Indian Stores Department, **Simla**, supplying considerable number of water meters, unit price quotation.

Ireland, River Suir—Allied Iron Wks. Ltd., West Bromwich, England, purchased 11 acre site and plans constructing new plant. $500,000.

New Zealand, Wellington—May 22, by Directors Stores Department, Post & Telegraph, supplying 2 mi. telephone switchboard cable; June

†*Federal Government*

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Foreign (Continued)

5. 8 mi. solid conductor rubber taped and braided cable.

Scotland—Edmiston & Brown Co., Ltd., 45 Midwharf St., **Glasgow**, preparing plans plant extension of Rubber Co. of Scotland, Ltd., $600,000•••**Glasgow** Municipality constructing 836 houses at Household Wood Estates, to Loudd & Inglis, Ltd., Coatbridge, $525,500; interior finish, to Dongall Constr. Co., Ltd., Glasgow, $413,780; plumbing, to Hugh Twaddle & Sons, Ltd., Glasgow, $207,195; roofing, to A. C White & Co., Ltd., Glasgow, $108,850; plastering, to W. Walker & Sons, Ltd., Glasgow, $67,215•••British Ministry of War, London, plans new artillery barracks at Redford Site, **Edinburgh**, $650,000•••Dundee Institute of Art & Technology, **Dundee**, plans new art institute, $450,000.

Scotland, Aberdeen — Municipality purchases sites at Woodside, Middlefield and Kincorth for erecting 7,100 houses of which 1,500 will be erected in 1936. $14,000,000.

Scotland, Edinburgh — City Council voted $500,000 for constructing cleansing depot at Russell Rd. and purchasing new mechanical transport; also $600,000 for sewage disposal plant at Portobello. W. A. Macartney, engr.

Scotland, Glasgow—Roemmgle Webb & Co. Ltd., 113 Douglas St., in market for brown, red and green lump marble. The marble is required for crushing, so size is not essential, the main consideration being that each piece, lump or block should be uniform in color.

Switzerland, Pratteln—A. G. Metallum, Bei Basle, Pratteln, in market for non-ferrous metals, incl. electrolitic copper wire rods, and pure nickel scrap and other semi-finished goods akin to non-ferrous metal group.

Wales—Swansea Brickworks Co. Ltd., Forest Fach, **Swansea**, in market for two 50 hp. a/c slip ring motors, 400 volts, 50 cycles, 3 phase, 720 revs., complete with starters•••Whitehead Iron & Steel Co. Ltd., **Newport**, plans plant on 60 acre site at Cwngram, $600,000.

Yugoslavia, Zenica—Friedrich Krupp Aktien, Geselleschaft, Essen, Germany to construct steel works, $3,000,000.

PUBLIC BUILDINGS

PROPOSED WORK

★ **Calif., Anaheim** — Anaheim Elementary School Dist., election May 5, $325,000 bonds for 2 new school buildings and reconstruction of all present school buildings. $487,520. Provided P.W.A. funds are available. Marsh, Smith & Powell, 816 West 5th St., Los Angeles, archts. Noted Apr. 10, C. D.—Apr. 16, E. N.-R.

Calif., Bakersfield—Supervs. Kern Co., plans by C. H. Biggar, Haberfelde Bldg., 2 story, rein.-con. library extension for Kern County Union High School Dist., in Bakersfield, $105,000; rein.-con. grandstand and music pavilion for Taft Union High School Dist., Taft, $100,000. L. H. Nishkian, 525 Market St., San Francisco, engr. Plans awaiting approval of State Division of Architecture.

★ **Calif., Los Angeles**—Los Angeles Bd. Educ., Chamber of Commerce Bldg., plans by A. C. Martin, 233 Higgins Bldg., new school plant at Abraham Lincoln High School, North Broadway and Mission Rd. $667,000. N. B. Patten, 228 Higgins Blvd., structural engr. E. L. Ellingwood, H. W. Hellman Bldg., mechanical engr.

Calif., Los Angeles—Bd. Educ., Chamber of Commerce Bldg., plans by Allison & Allison, 1014 Edison Bldg., library building, chemistry building, science building, cafeteria and students' union building at Los Angeles Junior College, $480,000. F. N. Ropp, structural engr., 1014 Edison Bldg., and E. L. Ellingwood, mechanical engr., H. W. Hellman Bldg., appointed to prepare structural, mechanical and acoustical plans. Noted Mar. 30, C. D.—Apr. 2, E. N.-R.

★ **Calif., Los Angeles**—Los Angeles Bd. Educ., Chamber of Commerce Bldg., plans by Hunt & Chambers, 1216 Continental Bldg., new Junior High School in South Los Angeles Dist., $400,000. C. Deuel, 405 Douglas Bldg., structural engr., E. L. Ellingwood, H. W. Hellman Bldg., mechanical engr.; plans by E. Bergstrom, 1136 Citizens National Bldg., new Junior High School, Verdugo Dist., $400,000, L. J. Waller, 931 Michelorenza, structural engr.; plans by A. C. Zimmerman, 709 H. W. Hellman Bldg., Junior High School in downtown district, $408,000. W. Mellema, 1661½ Beverly Blvd., structural engr. E. L. Ellingwood, H. W. Hellman Bldg., mechanical engr. for all projects.

★ **Calif., Los Angeles**—Los Angeles Bd. Educ., plans by H. L. Gogerty & C. E. Noerenberg, 6272 Yucca St., new high school, Western Dist. $500,000. C. T. Gibbs, 816 West 5th St., structural engr., O. W. Ott, Washington Bldg., mechanical engrs.

Calif., San Francisco—City and San Francisco Co., plans by F. H. Meyer, Kohl Bldg., brick, steel branch libraries, Bernal Heights and West Portal Districts. $150,000.

★ **Calif., San Francisco**—San Francisco Bay Exposition, Inc., Financial Center Bldg., plans by W. P. Day, director of works (of Exposition). Financial Center Bldg., 5 major exhibition buildings for 1939 World's Fair, est. $1,400,000; ferry terminal building, $274,900; 2 story, rein.-con., steel airport terminal building, pile found., $715,300; rein.-con., steel hangars on pile founds., $685,300; constructing walks, etc., on Yuerba Buena Shoals, $441,000, all foregoing on San Francisco Bay. Total est. $3,516,500.

Colo., Grand Junction—See "Waterworks."

Conn., Clinton—Town, Judge C. A. Pelton, chn. Bd. Trustees, Major Wm. Stanton Andrews Fund, sketches by Smith & Bassette, 36 Pearl St., Hartford, brick, stone memorial town hall, George E. Eliot property. $350,000 provided by will for above and $100,000 for maintenance of same. Noted Apr. 9, C. D.—Apr. 16, E. N.-R.

Conn., Darien — Town, E. H. Fuller, supt. Schools, sketches by John N. Pierson & Son, 313 State St., Perth Amboy, N. J., for Junior High School, brick, steel, stone. Post Rd. $285,000. Indefinite when plans will advance. Noted June 3, C. D.—June 6, E. N.-R.

Conn., Hartford — City, Bd. Educ., E. F. Nelson, 249 High St., P. Wks. Dpt., etc., plans by R. Hurley, Works Progress Engr., Hartford, rebuilding, cleaning and repairing Brown, Kinsella, Camp and Hooker Schools, $97,035; rehabilitating city shelter, $108,000; public market, east side bathhouse, city garage, $37,000, as Flood Emergency Program.

★ **Conn., Norwalk**—City, L. Downs, clk., revised plans by Tooker & Marsh, 101 Park Ave., New York, brick, steel, stone high school, East Ave. Bids Mar. 28 rejected. $909,000. P.W.A. project. J. L. Burley, Lime Hill Rd., engr. Noted Apr. 6, C. D.—Mar. 19, E. N.-R.

Fla., Palatka—City report in progress new power plant system. Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., engrs.

Ill., Menard—Dpt. P. Wks. & Buildings, Div. Architecture & Engineering, Springfield, plans by C. H. Hammond, state superv. archt., Capitol Bldg., Springfield, constructing 52x329 ft. cell building at Southern Illinois Penitentiary. $400,000.

Kan., Emporia—City, E. T. Mendel, clk., defeated $150,000 bonds for concrete, brick, stone city hall and jail. $273,000. P.W.A. project. Brinkman & Hogan, Citizens Bank Bldg., archts. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

Kan., Iola—City, final plans in progress light plant improvements, incl. new steam generating system and turbine. $220,000. Paulette & Wilson, Salina, engrs.

★ **Kan., Kansas City**—City making plans municipal power plant improvement, increasing capacity of plant 6,000 hp., boiler generating units. $2,000,000. Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Mo., engrs.

Ky., Leitchfield—Grayson Co., plans court house. Est. about $140,000. **Maturity indefinite.** Architect not appointed.

†**Mass., Truro**—U. S. Coast Guard, Custom House, Boston, making plans constructing 2 story, basement, concrete, brick barracks and boathouse, at U. S. Coast Guard Station. $35,000.

Mich., Detroit—Public Lighting Comn. engaged Smith, Hinchman & Grylls, engrs., 800 Marquette Bldg., to prepare plans for substation buildings, substation equipment, 24,000 volt oil switches, 24,000 volt bus structures and special metal-clad equipment on P.W.A. project for extension of city's electric light and power system. $300,000.

★ **Mo., Farmington**—State Hospital 4, Farmington, and Bi-Partisan Advisory Bd. State Building Comn., E. M. Eagan, executive secy., Jefferson City, bids in May, constructing 5 cottages and hall and drum building addition, $366,000-$440,000. P.W.A. project. T. P. Barnett Co., Arcade Bldg., Bonsack & Pearce, Inc., 411 Olive St., Dreiseorner & Leech, 3828 Arsenal St., E. T. Friton, Security Bldg., and O. J. Krieg, Wainwright Bldg., St. Louis, archts. for cottages. Felt, Dunham & Kriehn, 300 West 47th St., and Greenbaum & Hardy & Schumacher, Scaritt Ave., Kansas City, archts. on additions.

Mo., Fulton—State Hospital 1, Fulton, and Bi-Partisan Advisory Bd. of State Building Comn., E. M. Eagan, executive secy., Jefferson City, bids in May, constructing power plant. $350,470. P.W.A. project. R. Toensfeldt, Security Bldg., St. Louis, and Baumes-McDevitt Co., Railway Exch. Bldg., St. Louis, assoc. archts.

★ **Mo., Mount Vernon**—Missouri State Sanitorium, Mount Vernon, and Bi-Partisan Advisory Bd. State Building Comn., E. M. Eagan, executive secy., Jefferson City, bids in May, rein.-con. brick, stone administration and medical center buildings. $503,000. P.W.A. project.

Mo., Nevada—State Hospital 3, Nevada, and Bi-Partisan Advisory Bd. State Building Comn., E. M. Eagan, executive secy., Jefferson City, rejected bids Mar. 11, rein.-con., brick power plant. P.W.A. project. Will readvertise. Black & Veatch, 4706 Bway., Kansas City, engrs. Noted Mar. 19, C. D.—Mar. 26, E. N.-R.

Mo., St. Louis—Bd. P. Serv., City Hall, soon takes bids 1 story, basement, 55x70 ft., rein.-con., brick, stone police station and attached garage, 19th and Penrose Sts. Est. about $140,000. W. C. E. Becker, city engr. A. Osburg, city archt.

Mo., St. Louis—Bd. Aldermen passed ordinance calling election Aug. 4, $250,000 bonds, for constructing 2 new fire engine houses and equipment. Noted Mar. 19, C. D.—Mar. 26, E. N.-R.

New York—Department of Hospitals, S. S. Goldwater, Comr., Municipal Building, submitted to the Mayor a 10 year building program estimated to cost $53,000,000. The program is divided into three groups: **(1)** Projects included in capital outlay budget 1936: Research Hospital, **Welfare Island,** $5,500,000••• **(2)** Projects for initiation during next five years. **Manhattan**—Administration Building, $3,000,000; extension to nurses' home, employees' dormitory; Bellevue Hospital, $1,250,000; pavilion Willard Parker Hospital, $200,000; Harlem, out-patient building, $1,500,000; modernization hospital buildings and new hospital, $3,200,000•••**Brooklyn** — additions to Cumberland Hospital, $2,250,000; Hospital for Venereal Diseases, $2,250,000; extension outpatients' clinic Kings County Hospital, $500,000; expansion Coney Island Hospital and its out-patients' department, $1,500,000•••**Queens** —tuberculosis hospital, $4,000,000; and addition to Queensboro Hospital for Communicable Diseases, $250,000•••**Bronx**—Hospital for Communicable Diseases, $750,000; and tuberculosis hospital, $4,000,000•••**Welfare Island**—Clinics for city and metropolitan hospitals, $1,500,000 •••**Staten Island**—Replacement of shacks at Sea View Hospital and Farm Colony, $2,250,000•••**(3)** Projects for initiation in 1941 and after: Building for chronic patients Kings County Hospital, **Brooklyn,** $2,750,000; addition to Riverside Hospital, **North Brother Island,** $500,000; hospital for cancer patients, **Welfare Island,** $2,250,000; replacements of old building Home for Dependents, **Welfare Island,** $1,500,000; replacements of old buildings Municipal Sanatorium, **Otisville,** $2,250,000; hospital, Brownsville, **Brooklyn,** $4,500,000.

N. Y., Almond—Central School Dist. (forming), c/o W. Garwood, Canaseraga, supt. Schools, plans constructing Central School. To exceed $140,000. Architect and engineer not appointed. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

N. Y., Benton—Town plans by Child & Koch, 543 Exchange St., Geneva, fireproof storage building, 1 and 2 story, 60x136 ft.

N. Y., Canaseraga—Central School Dist., c/o W. Garwood, dist. supt. Schools, plans Central School. To exceed $140,000. Architect and engineer not appointed. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

N. Y., Canisteo—Bd. Educ. plans by R. A. Freeburg, Freeburg Bldg., Jamestown, brick, steel school, plain found., Greenwood St. $300,000. P.W.A. project.

N. Y., Dryden — Bd. Educ., Central School Dist. 1, soon takes new bids constructing school. $304,000. P.W.A. project. Bids Apr. 10 rejected. C. W. Clark, 27 North Main St., Cortland, archt. Noted Mar. 27, C. D.—Apr. 2, E. N.-R.

N. Y., Elmira—Dpt. Correction, State Office Bldg., Albany, bids later in 1936 constructing brick, steel administration building, plain found., at Elmira Reformatory, $450,000, W. E. Haugaard, State Office Bldg., Albany, archt. T. F. Farrell, State Office Bldg., Albany, engr. Noted Feb. 19, C. D.—Feb. 27, E. N.-R.

N. Y., Goshen—Bd. Supervs. Orange Co., bids in summer, brick, steel county office building, plain found., Main St. Est. about $140,000. W. S. Wick, 15 King St., Middletown, archt.

N. Y., Mexico—Union School Dist. 7 plans by H. O. Fullerton, Washington St., Albany, reconstructing school, recently destroyed by fire, $100,000-$140,000. Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

N. Y., Niskayuna — Town, Van Antwerp School Dist. 5, c/o R. Peters, 505 State St., Schenectady, plans constructing school addition. Van Antwerp Rd. J. M. Ryder, 404 State St., Schenectady, archt. May apply for federal funds.

N. Y., Northport—Bd. Educ. plans by J. Van Alst, Centerport, constructing school, East Northport. $200,000. Taxpayers of Northport School Dist. 4 petitioned for opportunity to vote on proposition for school. Noted Feb. 29, 1935, C. D.—Feb. 28, 1935, E. N.-R.

N. Y., Red Hook—Union Free School Dist. 4, Bd. Educ., plans reconstructing high school, recently destroyed by fire. To exceed $140,000. Architect and engineer not appointed.

N. Y., Schenectady—Bd. Educ., City Hall, plans new Senior High School in Grand Boulevard Section. To exceed $140,000. Architect and engineer not appointed.

N. Y., Utica—Bd. Educ., City Hall, plans by Bagg & Newkirk, 25 Genesee St., constructing high school addition in Armory Place on Hilton Ave. $212,000. Plans voting on appropriation of additional funds necessary to finance construction.

N. Y., Warsaw—Bd. Supervs. Wyoming Co., Warsaw, plans nearing completion by C. W. Eldridge, 27 East Bridge St., Oswego, constructing brick, steel hospital, plain found. Architect will release to contractors about May 1. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

N. C., Elon College—Elon College, Dr. L. E. Smith, pres., making plans college buildings near Burlington. $250,000. Total program $1,000,000.

N. C., Rocky Mount—T. W. Coleman, mayor, and Bd. Aldermen, indefinitely delayed award for electric wiring, elevator, plumbing, heating, jail cell equipment in 3 story municipal building. To exceed. Bids opened Mar. 19. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

N. C., Greensboro—Bd. Educ. Guilford Co., J. H. Joyner, chn., were unsuccessful in getting P.W.A. loan and grant for High Point City Schools, $150,000; Greensboro City Schools, $200,000, and for schools in county, $100,000. T. R. Foust, Greensboro, supt.

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†*Federal Government*

Public Buildings (Continued)

O., Chillicothe — Southeastern Rural School Dist. plans high school, U. S. Route 35. Option has been taken on site by Carmi Jones, pres. School Bd., pending outcome of $200,000 bond issue which voters will be asked to approve on May 12.

★ **O., Kent**—Kent University plans constructing union building to house campus social and student activities, new classrooms and additional dormitories, $1,000,000. Approved by Bd. Trustees.

O., Xenia—State Dpt. Welfare, Mrs. Margaret Ahlman, dir., plans new grade school building at Ohio Soldiers and Sailors Orphans Home, condemned by state fire marshal, also cottages, $175,000. Senate passed bill appropriating $125,000. J. P. Schooly, state archt.

†R. I., Narragansett—Treas. Dpt., Procurement Div., making plans constructing Narragansett Bay Quarantine Station. $95,000 granted for construction. $120,000 allotted, incl. land and equipment.

†R. I., Newport—Yards & Docks, Navy Dpt., Administration Bldg., making plans constructing explosive manufacturing building $225,000, torpedo storage building $100,000, and carpenter shop $50,000, at Naval Training Station.

†Tex., Fort Sam Houston—Con. Q.M., cancelled bids to have been opened Apr. 15, constructing 2 sets 2 story non-commissioned officers' quarters, $40,000. Noted Mar. 24, C. D. —Mar. 26, E. N.-R.

†Tex., Galveston—Treas. Dpt., Procurement Div., Wash., D. C., soon takes bids constructing 2 story, 43x63 ft. quarantine station, medical officers' quarters, pump house, fire pumps and water tower. $45,000.

†Vt., Hartford—Vet. Administration, Arlington Bldg., Wash., D. C., plans 2 and 3 story, brick, stone, hollow tile, concrete, steel hospital, also driveways, drainage, water system, off Windsor State Hy. $325,000. Private plans.

†Wash., Mount Vernon—Indian Service plans constructing 20 new homes on Swinomish Indian Reservation, near here. $32,000 appropriated.

Ont., Palmerston — Hydro-Electric Power Comn., 68 Dundas St., London, purchases site and plans constructing power station.

★ **Que., Quebec City**—Municipality plans house building program. $1,000,000. Contingent on approval of Provincial Legislature.

Sask., Regina—Major A. C. Ellison plans rehabilitation of Regina Homes, approximately $400,000. Contingent on Dominion Govt. grant.

BIDS ASKED

†Ark., Morrilton—May 12, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $68,000.

★ **Conn., Ansonia**—Apr. 30 (extended date), by High School Building Comn., general contract, heating, ventilating, plumbing and electrical work for new high school, Howard Ave. and Crescent St. Est. $423,000. P.W.A. project. W. Lescaze, 211 East 48th St., New York, archt. V. Sears, Ansonia, engr. Noted Apr. 17, C. D.—Apr. 16, E. N.-R.

†Fla., Madison—May 12, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $70,000; adv. E. N.-R., Apr. 23.

†Fla., Pensacola—May 13, by Yards & Docks, Navy Dpt., Wash., D. C., 4 electric elevators in Naval Air Station, Spec. 8182.

†Ill., Bushnell—May 12, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

†Ill., Flora—May 13, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $70,000.

†Ia., Onawa — May 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $62,000; adv. E. N.-R., Apr. 23.

†Ia., Pella—May 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $62,000.

†Ky., Louisville—May 18, by P. Wks. Administration, Housing Div., Wash., D. C., constructing superstructures College Court House Project H-2503. Noted Dec. 6, C. D.—Dec. 12, E. N.-R., under "Contracts Awarded."

†Ky., Louisville—May 28, by P. Wks. Administration, Housing Div., Wash., D. C., constructing superstructures LaSalle Place Housing Project H-2502. Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

†Md., Aberdeen—May 12, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office; adv. E. N.-R., Apr. 23. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

†Mass., Boston—May 19, by P. Wks. Administration, Housing Div., Wash., D. C., constructing superstructures Old Harbor Village Project H3302. Noted Nov. 29, C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

Mass., Northampton—Apr. 27, by Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, altering elevator shaftways and 2 passenger elevators at State Hospital, M. W. Maloney, 220 Dwight St., Springfield, engr.

†Mich., Clare—May 12, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000; adv. E. N.-R., Apr. 23.

†Mich., Crystal Falls—May 13, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $73,000.

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★ **Mich., Gaylord**—May 4, by G. R. Thompson, state budget dir., 1 and 2 story, brick, steel, stone, concrete sanatorium, incl. hospital, power house, laundry, nurses' home, physicians' residence, medical directors' home. $500,000. P.W.A. project. R. V. Gay, St. Johns, archt.

†Miss., Amory—May 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000; adv. E. N.-R., Apr. 23.

†Miss., Magnolia—May 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

Mo., St. Louis—Apr. 28, by City Bd. P. Serv., City Hall, furnishing, installing air conditioning system in Suite 200, City Hall. $7,000. P.W.A. project. W. C. E. Becker, city engr.

†Mont., Glendive—May 13, by Treas. Dpt. at office Sup. Archt., Wash., D. C., reconstructing U. S. Post Office.

†Neb., Minden—May 12, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $64,000; adv. E. N.-R., Apr. 23.

N. J., Vineland—Apr. 27, by Boro. City Hall, Contr. 3, plumbing and drainage, also Contr. 13, piping for power plant, for addition to municipal power stations. Total est. $80,000 plus. P.W.A. project. F. Daugherty, pres. Scofield Eng. Co., Commercial Trust Bldg., Phila., Pa., engrs.

★ **N. Y., Attica**—May 21, by Dpt. Correction, State Office Bldg., Albany, constructing cell block and service connections, heating, plumbing and electrical work at Attica State Prison. $800,000. W. E. Haugaard, State Office Bldg., Albany, archt. T. F. Farrell, State Office Bldg., Albany, engr. Noted Mar. 31, C. D.—Apr. 9, E. N.-R.

N. Y., Montgomery—Apr. 27, by Bd. Educ., Montgomery, general contract constructing school, Knappe & Morris, 192 Lexington Ave., New York, archts. Noted Dec. 10, C. D.—Dec. 12, E. N.-R.

N. Y., Morrisville—May 1, by Bd. Educ., Central School Dist. 1, towns of Eaton, Nelson, Lebanon, Fenner, Smithfield, Stockbridge, in Madison Co., at School Building, Morrisville, general contract, heating, plumbing and ventilating, electrical work for school, $247,000. P.W.A. project. C. W. Clark, Cortland, archt. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

N. Y., Newark—Apr. 27 (extended date), by State Dpt. Mental Hygiene, State Office Bldg., Albany, general contract farm colony buildings at Newark State School. W. E. Haugaard, State Office Bldg., Albany, archt. T. D. Farrell, state engr. Noted Mar. 23, C. D.—Mar. 26, E. N.-R.

N. Y., New Berlin—May 6 (extended date), by Central Rural School Dist. 1, constructing school. $286,000. Bley & Lyman, 505 Delaware Ave., Buffalo, archts. P.W.A. project. Noted Apr. 6, C. D.—Apr. 9, E. N.-R.

N. Y., Sherman—May 1, by Bd. Educ., Dist. 1, general contract, plumbing, heating, electrical work for school. $155,420. P.W.A. project. Beck & Tinkham, 100 East 4th St., Jamestown, archts. Noted Jan. 6, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

N. Y., South Dayton—Apr. 27, by Bd. Educ. Dist. 9, general contract, plumbing, heating, electrical work for school. P.W.A. project. A. Freeburg, Freeburg Bldg., Jamestown, archt. Noted Dec. 11, C. D.—Dec. 19, E. N.-R., under "Contracts Awarded."

†N. Y., West Point—May 6, by Con. Q.M., installing high pressure steam boilers and changes to power plant, incl. one 625 kw. turbine generator and fuel oil storage tanks; adv. E. N.-R., Apr. 23.

N. C., Morganton—Apr. 28, by State, Dr. J. McCampbell, supt., constructing Unit 4, 1 story, 28x65 ft. surgical wing adjoining main building; Unit 5, 1 story, 25x40 ft. day room, between Ward 28 and building for women; Unit 6, addition to Staff House, plumbing for above units and Unit 7, which consists of number of buildings already completed. C. C. and W. W. Hook, Commercial Bank Bldg., Charlotte, archts.

N. D., Devils Lake—May 1, by Bd. Educ., M. Tharalson, clk., superstructure for 2 story, basement, 262x295 ft., rein.-con., brick, steel school. $325,000. J. Marshall, Devils Lake, N. D., and N. W. Fisher, St. Cloud, Minn., archts. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

N. D., Dickinson—May 1, by Stark Co., c/o M. F. Leonhardt, aud., superstructure for 3 story, basement, 98x129 ft., brick, tile court house, $175,000. P.W.A. project. W. F. Kurke, Fargo, assoc. archt. H. Bechtel, Bismarck, archt.

N. D., San Haven—Apr. 30, by State Bd. Administration, E. G. Wanner, executive secy., Bismarck, furnishing power house equipment for North Dakota Tuberculosis Sanatorium. Bids Mar. 2 rejected for constructing power house. W. F. Kurke, Fargo, archt. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

†O., New Lexington—May 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $91,000.

†O., Wauseon—May 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $69,000.

†Okla., Cordell—May 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000; adv. E. N.-R., Apr. 23.

†Okla., Watonga—May 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000; adv. E. N.-R., Apr. 23.

†Pa., Muncy—May 15, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $70,000; adv. E. N.-R., Apr. 23.

†Pa., Phila.—P. Wks. Administration, Housing Div., Interior Bldg., Wash., D. C., demolishing buildings on site for Hill Creek Housing Project H-3001-C, to Cleveland Wrecking Co., 4115 Harrison Ave., Cincinnati, O., $1,918. Bids Mar. 26. Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

†Pa., Point Union—May 12, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $70,000.

★ **Pa., Scranton**—Scranton School Dist. J. Eckersely, secy., general contract Junior High School, Maple St. and Slocum Ave., to Keyno Smith Co., Broad St. Bank Bldg., Trenton, N. J., $1,058,300. Former contract of E. S. Williams, 342 New St., rescinded as it was ruled irregular by P.W.A. All other contracts as published approved by P.W.A. Noted Mar. 30, C. D.—Apr. 2, E. N.-R., under "Contracts Awarded."

†S. C., Columbia—May 15, by P. Wks. Administration, Housing Div., Wash., D. C., constructing superstructures of Columbia Terrace Housing Project. Project H-5201. Noted Dec. 2, C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

★ **†S. C., Greenville**—May 15, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $450,000.

Tex., Alpine—Sul Ross State Teachers College, c/o W. H. Moorelock, pres., taking bids installing, completing gas plant lines and fixtures. Butane gas specified. Lines will run to various buildings on the campus and connected with main plant. V. J. Smith, Alpine, engr.

Tex., Fort Worth — Bd. Educ., P. Williams bus. mgr., 409 East Weatherford St., general contract Arlington Heights Senior High School, 3 story, 130x312 ft., brick, stone, rein.-con., plain found., to Butcher & Sweeney, 806½ Taylor St., $260,500***plumbing and heating, to C. Wallace Plumbing Co., Dallas, $37,915***electrical wiring, to State Electric Co., 1607 Vaughn St., $14,400. Grand total $312,815. Bids Mar. 6. Noted Mar. 25, C. D.—Feb. 27, E. N.-R.

†Tex., Kennedy—May 15, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

Tex., San Antonio — Bd. Educ., c/o R. S. Menefee, pres., taking bids 2 story, 160x185 ft., semi-fireproof Junior High School building, incl. auditorium, cafeteria, library, science dpt., domestic science dpt., etc., Steves Gardens. $185,000. P.W.A. project. Phelps & DeWees, Gunter Bldg., board archts., L. M. J. Dielmann, 306 East Commerce St., consult. archt. J. W. Beretta Engineers, National Bank of Commerce Bldg., engrs.

†Va., Hopewell—May 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $95,000.

Va., Richmond—May 5, by Medical College of Virginia, constructing building, elevators, and metal partitions separately for Out Patient Clinic Building, 12th and Marshall Sts. P.W.A. project. Baskerville & Son, 2202 Central National Bank Bldg., archts.

★ **Ont., Ottawa**—Barott & Blackader, archts., Can. Cement Bldg., Montreal, Que., taking bids (from contractors in Montreal, Ottawa and Toronto), constructing 4 story, basement, brick, steel P.B.X. Telephone Exchange, plain found., O'Connor St., for Bell Telephone Co. of Canada, Ltd. Building about $500,000. Total est. $750,000-$1,000,000.

LOW BIDDERS

★ **N. Y., New York**—Dpt. Hospitals, Municipal Bldg., Apr. 14, general contract erecting and completing superstructure Central Nurses' Residence, Welfare Island, from J. Weinstein & Rubin Building Co., 66 Court St., Brooklyn, $1,163,700***electrical work, from J. and M. Hoffman, Inc., 3318 Avenue M, Brooklyn, $107,400***plumbing, from C. H. Cronin, 60 East 42nd St., New York, $156,700***heating, from Baker Smith & Co., 576 Greenwich Ave., New York, $115,789. Noted Apr. 6, C. D.—Apr. 9, E. N.-R.

CONTRACTS AWARDED

Calif., Oakland—Clinton Constr. Co., general contractors, 923 Folsom St., San Francisco, masonry for administration building and toll plaza, San Francisco-Oakland Bay Bridge approach, for State of California, California Toll Bridge Authority, 500 Sansome St., San Francisco, to White & Gloor, Monadnock Bldg., San Francisco, $360,857. Noted Sept. 20, C. D.—Sept. 26, E. N.-R., under "Contracts Awarded."

†Calif., Point Reyes—P. Wks. Officer, Mare Island, constructing, altering buildings, fencing, drains and concrete tank at U. S. Naval Direction Finder Station, Spec. 8150, to F. J. Early, 369 Pine St., San Francisco, $2,910. Bids Apr. 1. Noted Apr. 9, C. D.

Conn., New London—Connecticut State College for Women, c/o K. Blunt, pres., 3 story brick, stone dormitory, known as Mary Harkness House, to A. F. Peaslee, Inc., 15 Lewis St., Hartford, $155,000. Awarded Apr. 8. Noted Mar. 2, C. D.—Mar. 5, E. N.-R.

Ill., Mount Vernon—Mt. Vernon Twp. High School Dist., S. Echols, principal, general contract constructing 68x104 ft. classroom, 36 ft. high, 80x115 ft. auditorium, 35 ft. high and 122x144 ft. gymnasium, 34 ft. high additions

Public Buildings (Continued)

to high school, to Palmer & Baugher, 3184 South 7th St., $168,000; plumbing, heating and electrical work, to E. Wielt, 116 North 9th St., $45,543. **P.W.A.** Noted Nov. 15, C. D.—Nov. 21, E. N.-R.

†**Kan., McPherson**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to J. I. Barnes, Springfield, O., $49,000. Bids Mar. 16. Noted Mar. 19, C. D.—Feb. 20, E. N.-R.

La., Ruston—State Bd. Educ., Baton Rouge, tentatively awarded contract administration and classroom building, and auditorium and music building, to Caldwell Bros. & Hart, 816 Howard Ave., New Orleans, $421,249. Bids Apr. 4. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

Mass., Natick—W. J. Handley, general contractor, 47 Nockege St., Fitchburg, rock and shovel excavation for hospital addition and alterations, to Abel F. Stevens, Woodsdale Ave., Wellesley, for Town, Bd. Trustees of Leonard Morse Hospital, Merchants Assoc. Bldg.***steel and iron, to Eastern Bridge & Constr. Co., 88 Crescent St., Worcester***elevator, to A B See Elevator Co., Inc., 164 Stuart St., Boston*** heating, to J. G. Lamotte & Son, Inc., 143 Federal St., Boston***plumbing, to W. N. McKenna Co., 79 Chestnut St., Boston***electrical work, to M. B. Foster Electric Co., 368 Congress St., Boston***cast stone, to Stephen Bianchi & Co., 338 Copeland St., Quincy*** millwork, to Carl Olson & Sons, Inc., 314 South Broadway, Lawrence. Noted Mar. 20, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded."

Mass., Somerset—L. M. Witherell & Sons, general contractors, 29 Court St., Taunton, heating and plumbing for high school, County St., for Town, F. L. Hanson, chn., Building Com., to Babbitt & Simmons, 94 Weir St., Taunton***electrical work, to Brady Electric Co., Inc., 236 Bedford St., Fall River***excavation, to Montaup Sand & Gravel Co., Swansea ***reinforcing steel, to Concrete Steel Co., 294 Wash. St., Boston***structural steel and iron, to John E Cox Co., Inc., 753 Davol St., Fall River***cast stone, to Sagamore Duntile Mfg. Co., Sagamore***granite, to Providence Granite Co., 210 Kinsley Ave., Providence, R. I.***tile, bluestone, etc., to Capitol Marble & Tile Co., Inc., 48 Oxford St., Providence, R. I.***roofing, to Wolfe Sheet Metal Wks., 83 Weir St., Taunton***painting, to A. C. Lewis Co., Inc., 6 Trescott St., Taunton. Steel erection, masonry and insulation by the general contractors. Noted Mar. 31, C. D.—Apr. 9, E. N.-R., under "Contracts Awarded."

Mass., Waltham—Thomas O'Connor & Co., general contractors, 238 Main St., Cambridge, sprinklers for 2 story, basement, 38x136 ft. and 40x512 ft. ward building, surgeial wing and dining rooms, at Middlesex County Hospital, to C. H. Cronin, Inc., 14 Byron St., Boston, for Middlesex Co., County Comn., Court House, Cambridge. Noted Mar. 13, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

†**Miss., Newton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Murphy Pound, Columbus, Ga., $41,365. Bids Mar. 27. Noted Apr. 1, C. D.—Mar. 12, E. N.-R.

Mo., Kansas City—City, H. F. McElroy, mgr., constructing lighting fixtures for theatre and function room of Municipal Auditorium and installing same, to Livers Lighting & Bronze Co., 1722 Tracy St. $23,000. **P.W.A.** Bids Feb. 20. Noted Mar. 4, C. D.—Feb. 20, E. N.R.

Mo., Koch—H. B. Deal & Co., general contractors, 1218 Olive St., St. Louis, excavating for 3 story, basement, 65x162 ft., rein.-con., brick ward building, for Robert Koch Hospital, Mississippi River, here, to A. P. Nolan & Co., 1419 Michigan St., St. Louis***waterproofing and expansion joints, to E. J. Scally, 3931 Potomac St., St. Louis***cement work, to Wright Bros., 3822 Anne Ave., St. Louis*** rubble masonry, to Carthage Stone Co.***sill and stone setting, to Wabash Stone Co., 5100 Wise St., St. Louis***limestone, to Heltonville Stone Co., Heltonville, Ind.***brick, terra cotta, tile partitions, to Uthoff Stathman, 3675A Dover St., St. Louis***iron and steel, to LaSalle Iron Wks., 3110 LaSalle St., St. Louis ***sheet metal work, to Western Sheet Metal Wks., 4466 Finney St., St. Louis***mill work, to McClelland Co., Davenport, Ia.***stair rails, to St. Louis Stair Co., 6114 Wagner St., St. Louis***steel windows, to Detroit Steel Products Co., 2250 East Grand Blvd., Detroit, Mich. ***setting steel windows, to Sears & Piou, 305 Arsenal St., St. Louis***hollow metal work, to Niedringhaus, Inc., 5739 Natural Bridge Ave., St. Louis***composition and tile roofing, to South St. Louis Slate & Tile Roofing Co., 6147 Manchester St., St. Louis***plastering, to L. Tackser Plastering Co., 817 North 9th St., St. Louis***painting, to J. S. Dowling & Co., 2224 Franklin St., St. Louis***glazing, to Burroughs Glass Co., 305 Arsenal St., St. Louis ***marble, to Schreiner Marble & Tile Co., 5012 South 38th St., St. Louis***precast terrazzo, to Giudicy Marble & Tile Co., 3805 Eiler St., St. Louis***mass terrazzo, to J. Pellarin & Co., 1422 Goodfellow St., St. Louis*** linoleum, to Universal Construction Furnishing Co., 4563 Gravois St., St. Louis***fly screens, to Chamberlain Metal Weather Strip Co., 452 North Boyle St., St. Louis***shades, to Kuhlman Metal Weather Strip Co., 3801 Forest Park Ave., St. Louis***shelving, to Berger Mfg. Co., Paul Brown Bldg., St. Louis. Noted Mar. 10, C. D.—Mar. 12, E. N.-R., under "Contracts Awarded."

N. H., Nashua—E. J. Pinney Co., Inc., general contractors, 220 Dwight St., Springfield, Mass., structural steel for high school, to Groisser & Shlager Iron Wks., 84 Wash. St., Somerville, for City, I. D. Ravenelle, clk., E. T. Tracy, supt. Schools, City Hall***light iron, to American Architectural Iron Co., 111 Liverpool St., East Boston, Mass.***roofing and sheet metal, to Columbia Cornice Co., 286 Elm St., Cambridge, Mass.***paint, to H. Newton Marshall Co., 522 Harrison Ave., Boston, Mass. ***granite, to J. Swenson Granite Co., West Concord***limestone, to Heltonville Limestone Co., Bedford, Ind.***bleachers, to Chain-Link Fence Co., 64 Pearl St., Boston, Mass. Noted Apr. 8, C. D.—Apr. 16, E. N.-R., under "Contracts Awarded."

N. J., Mount Holly—Rancocas Valley Regional Bd. Educ., High School, general contract constructing Rancocas Valley Regional School, to Slonk Constr. Co., 235 Lincoln Ave., Elizabeth, $180,918***steel and iron, to Belmont Iron Wks., 22nd St. and Washington Ave., Phila., Pa., $16,000***heating and ventilating, to F. P. Farrell, 269 Camden Ave., Newark, $26,474***plumbing, to H. Knecht Co., West Collingswood, $14,457***electrical work, to Flanagan Electric Co., 42 Livingston St., Trenton, $18,253. Grand total $256,102. Noted Mar. 27 C. D.—Apr. 2, E. N.-R.

N. Y., Chester—G. Stanley Irish, general contractors, Colvin St., rubber tile and cork tile for school, for Bd. Educ., to D. E. Kennedy, 58 2nd Ave., Brooklyn. **P.W.A.** Noted Jan. 6, C. D. —Jan. 9, E. N.-R., under "Contracts Awarded."

Daily News Service

The McGraw-Hill *Construction Daily* reports news of proposed work, bids asked, low bidders and contracts awarded, five times per week by first class and air mail. Subscription rate, $10 per month ($1 additional for air mail). Business News Department, *Engineering News-Record*, 330 W. 42nd St., New York, N. Y.

N. Y., Clarence—Gambin Constr. Co., general contractors, 31 Harriett St., Buffalo, constructing roof for school for Union Free School Dist. 1, to Carey Co., 1174 Niagara St., Buffalo; millwork, to Bison Lumber Co., 465 Cornwall Ave., Buffalo***metal lathing and plastering, to Fred Seitz, 45 Avery Pl., Cheektowaga. **P.W.A.** Noted Jan. 29, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

N. Y., Falconer—Benz Eng. Corp., general contractors, 33 Main St., Salamanca, roofing for school, for Bd. Educ. School Dist. 6, to Unland Bros., 868 Jefferson Ave., Buffalo***cast stone, to Goodstone Mfg. Co., 470 Hollenbeck St., Rochester***millwork, to Chall Co., Fluvanna Ave., Jamestown. **P.W.A.** Noted Feb. 7, C. D.—Feb. 13, E. N.-R., under 'Contracts Awarded."

N. Y., Farmingdale—State Bd. Educ., Education Bldg., Albany, general contract dormitory and dining hall at New York State Institute of Applied Agriculture, to E. Corning Co., 204 East 39th St., New York, $167,981***sanitary work, to F. S. Robbins, P. O. Box 866, Babylon, $13,989***heating, to Astoria Heating Co., 41-51 70th St., Woodside, $12,977***electrical work, to Miller Brown, Inc., 31 Union Sq., New York, $8,121. Grand total $203,068. General contractor awarded contract 315 tons structural steel, to American Bridge Co., 71 Bway., New York. Bids Feb. 20. Noted Feb. 18, C. D.

N. Y., Glens Falls—Duplex Constr. Co., general contractor, 149 Glen St., limestone for school, Sagamore Ave., for Union Free School Dist. 1, Queensbury, to Ingalls Stone Co., Bedford, Ind.***metal lathing and plastering, to Henderson, Johnson Co., East Erie Blvd., Syracuse***roofing, to Joyce & Kramer, Inc., 110 Hamilton St., Albany***ornamental iron, to B. Heckerman Iron Wks., 1100 East Water St., Syracuse. **P.W.A.** Noted Mar. 31, C. D.—Apr. 9, E. N.-R.

N. Y., Glens Falls—Duplex Constr. Co., general contractors, 148 Glen St., cast stone for Union Free School Dist. 18, Queensbury, to Architectural Stone Co., Turners Falls***metal lathing and plastering, to Henderson Johnson Co., East Erie Blvd., Syracuse***roofing, to Joyce & Kramer, Inc., 110 Hamilton St., Albany***reinforcing bars, to Albany Sheet & Iron Supply Co., Troy Rd., Albany. **P.W.A.** Noted Mar. 30, C. D.—Apr. 2, E. N.-R.

N. Y., Kenmore—J. W. Cowper Co., general contractors, Rand Bldg., Buffalo, structural steel for municipal building for Town of Tonawanda and Village of Kenmore, to R. S. McManus, Steel Constr. Co., 2145 East Ferry St., Buffalo; cut stone, to Loomis Stone & Marble Co., 1776 Elmwood Ave., Buffalo. **P.W.A.** Noted Mar. 30, C. D.—Apr. 2, E. N.-R., under "Contracts Awarded."

N. Y., Newburgh—W. L. Crow Co., general contractors, 101 Park Ave., reinforcing steel for school, Monument St., for Bd. Educ., to Bethlehem Steel Co., Bethlehem, Pa.; limestone, to Indiana Limestone Corp., Bedford, Ind. **P.W.A.** Noted Mar. 30, C. D.—Apr. 2, E. N.-R., under "Contracts Awarded."

N. Y., Oswego—B. Z. Contg. Co., general contractors, 52 Vanderbilt Ave., New York, reinforcing steel for U. S. Post Office, 1st St., for Treas. Dpt. at office Sup. Archt., Wash., D. C., to Capitol Steel Co., 186 Joralemon St., Brooklyn***electrical work, to Snyder & Micken, 201 West 1st St. Noted Oct. 7, C. D. —Oct. 10, E. N.-R., under "Contracts Awarded."

N. Y., Schoharie—A. Panzieri, Inc., general contractors, Terminal St., Albany, roofing for county jail for Bd. Supervs., Schoharie Co., to Joyce & Kramer, Inc., 110 Hamilton St., Albany; jail windows, to Security Products Co., 2215 DeKalb St., St. Louis, Mo. **P.W.A.** Noted Mar. 23, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded."

N. Y., Tuckahoe—Bd. Educ. Dist. 1, general contract high school, White Plains Post Rd., to A. Severio, Mount Vernon, $196,650***plumbing, to J. Winkel Co., Larchmont, $26,714*** heating, to Dirks Heating Co., 210 East 31st St., New York, $37,634***electrical work, to G. H. McKee Co., Mount Vernon, $24,200. Grand total $285,198. **P.W.A.** Bids Mar. 30. Noted Mar. 23, C. D.—Mar. 26, E. N.-R.

N. Y., Watervliet—J. J. Turner & Sons, general contractor, 20 Edward St., Amsterdam, roads, excavation and drainage for school, 14th St., for Bd. Educ., to S. B. Easton, 47 Fairlawn Ave., Albany***mastic and rubber tile floors, to D. E. Kennedy, Inc., 58-60 2nd Ave., Brooklyn***millwork, to Albany Lumber & Planing Mill Co., Inc., Bridge St., Albany***erecting structural steel, to Leader Constr. Co., 303 4th Ave., New York***steel sash, to Hopes Windows, Inc., 84 Hopkins Ave., Jamestown. **P.W.A.** Noted Jan. 22, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

N. Y., Weedsport—Swartout & Rowley, general contractors, 548 Mount Hope Ave., Rochester, metal lathing and plastering for school, to Henderson Johnson Co., Erie Blvd. E., Syracuse, for Union Free School Dist. 2. P.W.A. project. Noted Nov. 26, C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

N. Y., Whitney Point—W. A. Berbusse, Jr., Inc., general contractors, 35 Bush Ave., Portchester, carpentry work for school for Bd. Educ., to Sofarelli Bros., 9232 Union Hall St., Jamaica***cement finishing, to Harrison & Meyer, Inc., 1182 Bway., New York***metal lathing, to Henderson Johnson Co., Erie Blvd., Syracuse. **P.W.A.** Noted Oct. 31, C. D.—Nov. 7, E. N.-R.

N. Y., Woodlawn—Union Free School Dist. 13, general contract school, to B. Rebescher & Sons, 110 Timon St., Buffalo***plumbing, to Fish & Kronenberg, Main St., Hamburg***heating, to L. H. Bulger, 1354 Kenmore Ave., Buffalo***electrical work, to Wipperman & Mitchell, 404 North Oak St., Buffalo. **P.W.A.** Bids Apr. 1. Noted Apr. 6, C. D.—Mar. 19, E. N.-R.

O., Bethel—Village, heating for school, to Stanton Heater Co., Martins Ferry, $5,345. **P.W.A.** Bids Mar. 30. Noted Mar. 18, C. D.—Mar. 26, E. N.-R.

O., Woodlawn—City, heating and ventilating for school, to Columbus Heating & Ventilating Co., 400 Dublin Ave., Columbus, $5,990. **P.W.A.** Noted Mar. 18, C. D.—Mar. 26, E. N.-R.

†**Okla., Claremont**—Dpt. Indian Affairs, Dpt. Interior, Wash., D. C., constructing 2 story, 40x127 ft. annex to Indian Hospital, to Manhattan Constr. Co., 1st Natl. Bank Bldg., Oklahoma City, $126,935. Bids Apr. 7, awarded Apr. 9. Noted Apr. 13, C. D.—Mar. 12, E. N.-R

†**Okla., Tahlequah**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to A. Blair, 1st Natl. Bank Bldg., Montgomery, Ala., $45,786. Bids Apr. 3, Noted Apr. 7, C. D.—Mar. 12, E. N.-R.

Pa., Lock Haven—See "Waterworks."

R. I., Howard (Cranston)—Matthew Cummings Co., general contractors, 43 Tremont St., Providence, structural steel, light iron for buildings for disturbed men and women, to James H. Tower Iron Wks., 50 Borden St., Providence, for State Emergency P. Wks. Comn., State House, Providence***roofing, to Eagle Cornice Co., 314 Blackstone St., Providence***paint, to Scully-McDonnell & Co., Inc., Providence*** reinforcing steel, to Bethlehem Steel Co., 75 Federal St., Boston, Mass.***waterproofing, to Travers Sandall, Inc., 238 Elm St., Cambridge, Mass. Noted Apr. 7, C. D.—Apr. 9, E. N.-R., under "Contracts Awarded."

R. I., Howard (Cranston)—Tucker Constr. Co., general contractors, 346 Washington St., Providence, 200 tons structural steel for medical and surgical building at mental hospital, to Providence Steel & Iron Co., 27 Sims Ave., Providence, for State Emergency P. Wks. Comn., State House, Providence. Noted Mar. 11, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

R. I., Warwick — Central Engineering & Constr. Co., general contractors, 210 Main St., Pawtucket, limestone for grade school, Caspee Plateau, to Alexander Thomson, Inc., Allens Ave., Providence, for City, J. A. O'Brien, mayor ***granite, to E. Bernardo, 15 Murray St., North Providence***painting, to Scully-McDonnell & Co., Inc., 71 Tyndall Ave., Providence ***structural steel, to Providence Steel & Iron Co., 27 Sims Ave.***marble, to Capitol Marble & Tile Co., Inc., 48 Oxford St., Providence. Noted Feb. 10, C. D.—Feb. 13, E. N.-R., under "Contracts Awarded."

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†*Federal Government.*

Public Buildings (Continued)

†**Tenn., Memphis** — P. Wks. Administration, Div., Housing, Wash., D. C., constructing foundations for Dixie Homes Housing Project H-3401, to S. and W. Constr. Co., 983 Shrine Bldg., $298,793. Bids Mar. 19. Noted Mar. 27, C. D.—Mar. 12, E. N.-R.

Tex., Wichita Falls—Bd. Educ., c/o C. H. Clark, 2 story, basement., Junior College superstructure (tentative award) to Thos. Bate & Son, $289,500, not incl. plumbing, heating. P.W.A. Bids Apr. 2. Noted Mar. 26, C. D.—Jan. 16, E. N.-R.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Huntington Park — Eastern Stores, A. Sieroty, mgr., 855 South Broadway, Los Angeles, plans by C. Beelman, 1019 Union Bank Bldg., Los Angeles, not less than 3 story, 57x150 ft. store, Pacific Ave., Zoe and Saturn Sts. Est. about $140,000.

Calif., Los Angeles—Owner plans by M. Maltzman, 1698½ Cordova St., 8 story, class A apartment building. $175,000 for material only.

Calif., Los Angeles—Charles and J. Crail, Bartlett Bldg., plans by S. C. Lee, 1648 Wilshire Blvd., 4 story, basement, rein.-con. business college, incl. auditorium and classrooms, St. Paul Ave. and Wilshire Blvd. $200,000. Noted Feb. 28, C. D.—Mar. 5, E. N.-R.

Calif., San Rafael—Blumenfield Theater Corp., 25 Taylor St., San Francisco, plans by W. Rowe, 351 California St., San Francisco, rein.-con., steel theater, 1,800 seating capacity, 4th St. Est. $150,000.

Conn., Hartford — St. Anthorny's Roman Catholic Church, A. J. Kelly, pastor, Judge Francis A. Pallotti, chn. Church Comn., plans yellow brick, stone church, Market St. to replace edifice damaged by flood. $140,000. Architect not appointed.

Md., Baltimore—Stewart & Co., Howard and Lexington Aves., sketches by Starrett & Van Vleck, 267 5th Ave., New York, modernization of department store, Howard and Lexington Aves. $150,000.

Mass., Williamstown — Williams College, E. A. Locke, dir. Health & Athletics, plans brick athletic building to house baseball indoor practice cage, hockey rink, track, etc. Est. $150,000. Architect not appointed.

Mich., Detroit—Midway Theatre Corp., c/o Bennett & Straight, archts., Schaeffer Bldg., Dearborn, plans 1 and 2 story, basement, 95x286 ft., brick, steel, concrete theatre, plain found, Warren St. $150,000.

Mich., Muskegon — Occidental Hotel, E. R. Swett, mgr., plans by Holabird & Root, 333 North Michigan Ave., Chicago, Ill., 4 story, basement, 70x132 ft., brick, steel, stone hotel addition, Western Ave. $175,000. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

Minn., Minneapolis — St. Barnabas Hospital, S. W. Rice, supt., 901 South 6th St., plans by Hewitt & Brown, 248 Foshay Tower, 5 story, basement, rein.-con., brick hospital addition, incl. elevators, steam heating, etc., 7th St. from 9th to 10th Aves. S., $150,000.

Minn., Minneapolis — Westminister Presbyterian Church, T. F. Wallace, chn. Building Committee, 124 Groveland Ave., plans by Magney & Tusler, 104 South 9th St., 4 or 5 story, rein.-con., brick, stone addition to Abbott Hospital, 18th St. between 1st and Stevens Aves. $350,000.

Mo., St. Louis—St. Wencelaus Catholic Parish, W. H. Hamtil, pastor, 3018 Oregon Ave., soon lets contract 2 story, basement, 97x125 ft., rein.-con., brick school and convent, Oregon Ave. and Arsenal St. O'Meara & Hills, 5709 Waterman Ave., archts.

Mo., University City (St. Louis P. O.)—All Saints Roman Catholic Parish, G. M. Ryan, pastor, 5403 Clemens Ave., plans by H. P. Hess, 1001 Ambassador Bldg., St. Louis, and soon takes bids 1 story, basement, 70x130 ft., rein.-con., stone church, Westgate and Clemens Aves.

N. Y., Albany—Wellington Hotel, 136 State St., plans installing plumbing and bath additions in hotel. Owner will purchase materials.

N. Y., Annandale-on-Hudson—Bard College, H. P. Robbins, chn. Building Committee, 405 Lexington Ave. and Annandale-on-Hudson, bids early in June constructing 4 story brick, steel dormitory, plain found., on campus, $150,000. Evans, Moore & Wodbridge, 101 Park Ave., New York, archts. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

N. Y., Brooklyn—Corporation, c/o J. Dorment, 66 Court St., plans by B. Driesler, Jr., 163 Remsen St., 2 story, 20x32 ft., brick dwellings, Gerritsen Ave. near Fillmore Ave. $140,000.

N. Y., Brooklyn—Corporation, c/o P. Goldfine, 535 5th Ave., New York, plans by H. I. Feldman, 15 West 44th St., New York, constructing 6 story, brick apartment, plain found., Ocean Ave. near Caton Ave. Est. about $140,000.

N. Y., Brooklyn—Corporation, c/o T. Steinberg, 16 Court St., plans by Kavy & Kavovitt, 16 Court St., 6 story, brick apartment, 1354 54th St. $140,000.

N. Y., Brooklyn—James Bros. Realty Corp., 213 Duffield St., plans by Chapman & Beder, 101 Park Ave., New York, constructing factory addition, 110 Willoughby St. $38,000.

N. Y., Brooklyn—H. Waxman, 2031 72nd St., plans by I. Kallich, 375 Fulton St., 2 story, brick dwellings, 66th St. near 8th Ave. $140,000.

N. Y., Brooklyn—Merida Holding Corp., J. Greenholtz, pres., 186 Remsen St., plans by M. N. Weinstein, 93 Court St., 6 story apartment, 2530 Kingshighway. $175,000.

N. Y., Brooklyn—Moses Lipschitz, 66 Court St., plans by Kavy & Kavovitt, 16 Court St., 6 story apartments, Avenue T near East 17th St. $225,000.

N. Y., Brooklyn—Sabella Homes, Inc., 1612 West 5th St., plans by Gerlando Lamarca, 369 Fulton St., group 2 story, brick dwellings, 1249 East 85th St. and vicinity. $140,000 or more.

N. Y., Brooklyn—Clinton Vanderbilt Corp., 189 Montague St., plans by M. E. Ungarleider, 191 Joralemon St., 6 story, brick apartment, 218 Sterling Pl., $140,000.

N. Y., Brooklyn—Manack Realty Corp., 391 Fulton St., plans by W. A. Lacerenza, 391 Fulton St., group brick dwellings, 2266 East 18th St. $140,000 or more.

N. Y., Brooklyn—A. E. and A. A. Sockmann, 188-11 Illion Ave., Hollis, bids in September or later, constructing store and theatre, Church Ave. and 7th St. $350,000. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

N. Y., Buffalo—William Hengerger Co., 465 Main St., Buffalo, and Associated Drygoods Co., 4 West 35th St., New York, sketches by Starrett & Van Vleck, 267 5th Ave., New York, archts., modernizing department store, 465 Main St. $150,000 or more.

N. Y., Chestertown — St. John the Baptist Roman Catholic Church, F. McMahon, pastor, North Creek, plans nearing completion by Gander, Gander & Gander, 17 Steuben St., Albany, and takes bids late in May, constructing church. Main St.

N. Y., Churchville—Gorsline & Swan Constr. Co., foundation contractors, 96 Pearl St., Rochester, reinforcing steel for school, Buffalo Ave., for Bd. Educ. Union Free School Dist. 4, to Genesee Bridge Co., 344 West Ave., Rochester. Total est. $185,000. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

N. Y., Elmhurst—Solita Corp., 485 Madison Ave., New York, plans by A. E. Allen, Garden City, group 40 or more dwellings, Hillyer St. near Kneeland Ave. $225,000.

N. Y., Flushing—Ambassador Realty Corp., Linden Blvd., St. Albans, plans by A. E. Allen, Garden City, group 2 story, frame dwellings, Foch Blvd. and 226th St. $140,000.

N. Y., Flushing—Oakland Realty Corp., 59-11 Queens Blvd., Woodside, plans by A. E. Allen, Garden City, constructing group 2 story, brick dwellings, Elder Ave. and Byrd St. $150,000.

★ **N. Y., Flushing**—M. J. Roth, Elder Ave., Cherry and Main Sts., plans group 75 dwellings, Elder Ave., Cherry and Main Sts. To exceed $400,000. Private plans.

N. Y., Fort Wadsworth—Charity Church of Christ, 533 4th Ave., Brooklyn, constructing 6 story, brick orphanage, incl. swimming pool, Fingerboard Rd. and Sterling St. $150,000.

N. Y., Glen Cove—G. Gifford, 161-10 Jamaica Ave., Jamaica, plans constructing dwellings and tract development, Cedar Swamp Rd. $140,000. Private plans.

N. Y., Great Neck—S. K. Petersen, Old Mill Rd., Great Neck, plans group 35 brick dwellings, Old Mill Rd. $250,000 or more.

N. Y., Ithaca—N. B. Schickel, 305 Cornell St., Ithaca, plans nearing completion constructing 3 story, basement, concrete apartment. Est. about $140,000, incl. equipment.

N. Y., Long Island City—Whitney Crescent Corp., 24-16 Bridge Plaza South, plans by B. Braunstein, 163-18 Jamaica Ave., Jamaica, 6 story, brick apartment, plain found., 30th Rd. and Crescent St. $350,000.

N. Y., Lynbrook — Stonecraft Homes, Inc., c/o M. Katz, 1298 Far Rockaway Blvd., Far Rockaway, plans constructing group 100 brick dwellings, Whitehall St., Norma and Kensington Aves. To exceed $400,000. Site acquired.

N. Y., Maspeth—D. Salmow, 200 West 90th St., New York, plans by B. Dreisler, c/o owner, group 2 story, frame dwellings, 63rd Pl. and 55th Ave. $140,000 or more.

N. Y., Middle Village—Brock White Homes, Inc., 76-01 Roosevelt Ave., Jackson Heights, plans by S. M. Palm, 159-15 Northern Blvd., Flushing, constructing group 2 story dwellings, 80th St. $140,000.

N. Y., New York—Associated Dry Goods Co., 4 West 35th St. (Lord & Taylor Store) sketches by Starrett & Van Vleck, 267 5th Ave., modernizing department store. To exceed $150,000. Noted Mar. 27, C. D.—Apr. 2, E. N.-R.

N. Y., New York—Bradby Realty Corp., 2750 Bway., plans by J. M. Felson, 250 West 57th St., 6 story apartment, Creston Ave. near 182nd St. $200,000.

N. Y., New York—B. Caro, 570 7th Ave., plans 7 story apartment, Jacobus Pl. and 225th St. $350,000. Site acquired.

N. Y., New York—Clarking Realty Co., 120 Bway., altering heating, plumbing in 6 story store and apartment, 110 Cannon St. $38,000 with fixtures. Private plans.

N. Y., New York—Grace LeRoy, 340 West 23rd St., plans by A. Grossman, 375 8th Ave., altering heating, plumbing in two 4 story apartments, 335 West 19th St. $40,000 with fixtures.

N. Y., New York—LaSalle Academy, 44 East 2nd St., soon lets contract constructing two 5 story dormitories, 44 East 2nd St., $225,000. J. W. O'Connor & J. F. Delany, 162 East 37th, archts. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

N. Y., New York—Lenox Hill Hospital, 100 Ave. and 76th St., revised plans by York & Sawyer, 100 East 42nd St., 2 story, 42,000 ft. hospital addition, incl. swimming pool, 30 East 76th St. $150,000.

N. Y., New York—J. M. McConnell, 1414 Shakespeare Ave., plans by Bates & Hellmann, 2526 Webster Ave., constructing 6 story, brick apartment, 201st St. Est. about $100,000.

N. Y., New York—New York Savings Bank, 81 8th Ave., New York, plans by G. Pronti, c/o owner, altering heating, plumbing in one 3 story, and one 5 story store buildings, 144 West 17th St., $37,000 with fixtures.

N. Y., New York—J. Durst, 358 5th Ave., plans altering heating, plumbing and elevator in 7 story apartment and store, 89th St. and Madison Ave. $38,000 or more. Architect not appointed.

N. Y., New York — Jacob Ruppert Realty Corp., 1639 3rd Ave., soon takes bids general and separate contracts altering heating, plumbing in 20 story office, 110 East 24th St. $50,000. F. A. Parker, 533 West 57th St., archt. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., New York—Starlight Properties, Inc., 328 East 53rd St., plans by C. N. and S. Whinston, 2 Columbus Circle, altering heating, plumbing in apartment, 233 East 54th St., $38,000 with fixtures.

N. Y., New York—Valentine Equities, 1115 East 177th St., plans by J. M. Felson, 250 West 51st St., 6 story, brick apartment, plain found., Valentine Ave. and 184th St. $175,000.

N. Y., Valley Stream — Schlossman Bros., Merrick Rd. and Sunrise Hy., plans constructing (2nd unit), 50 brick dwellings, vicinity of Merrick Rd. and Sunrise Hy. To exceed $200,000. Private plans.

N. Y., Woodside—Fredlen Realty Corp., 14-44 31st Ave., Long Island City, plans by Wurst & Bailey, Bridge Plaza, Long Island City, group 4 story tenements, 60th St. and Woodside Ave. $140,000.

★ **O., Columbus** — R. Schiff, 360 Columbia Ave., soon lets contract constructing 77 suite fireproof apartment. $500,000. B. Pepinsky, Times Star Bldg., Cincinnati, archt. Noted Jan. 23, C. D.—Jan. 30, E. N.-R.

Pa., Williamsport—First Presbyterian Church, Rev. D. F. Burrell, pastor, 3rd and Mulberry Sts., plans new brick, steel, stone church, possibly Louisa St. $150,000-$200,000. Architect not appointed.

Ont., Toronto—George Nielson, archt., 205 Snowdon Ave., soon takes bids 5 story, basement, brick, steel, 90 suite apartment house, plain found., Oriole Parkway, for L. A. Liscombe, c/o archt.

BIDS ASKED

N. J., Bloomfield—See "Contracts Awarded."

N. J., Teaneck—See "Contracts Awarded."

N. Y., Cortland—Apr. 27, by P. M. Hulsken and L. T. Strong, archts., 505 Savings Bldg., Lima, O., remodeling and altering theatre into department store, for Schine Chain Theatre Corp., 40 West Main St., Gloversville, Sears, Roebuck, Arthington St., Chicago, Ill., lessee. Noted Mar. 26, C. D.—Apr. 2, E. N.-R.

N. Y., Bayside—See "Contracts Awarded."

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Elmhurst—See "Contracts Awarded."

N. Y., Flushing—See "Contracts Awarded."

N. Y., Hartsdale—See "Contracts Awarded."

N. Y., Hollis—See "Contracts Awarded."

N. Y., Ithaca—See "Contracts Awarded."

N. Y., Kew Gardens — See "Contracts Awarded."

N. Y., Long Island City — See "Contracts Awarded."

N. Y., New Rochelle — See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

N. Y., Ozone Park—See "Contracts Awarded."

N. Y., Rye—See "Contracts Awarded."

N. Y., Springfield—See "Contracts Awarded."

N. Y., White Plains — See "Contracts Awarded."

N. Y., Woodside—See "Contracts Awarded."

Wis., Milwaukee—Gimbel Bros., 101 West Wisconsin Ave., taking bids altering department store, new fronts, etc. $250,000. F. F. Droleshogen, 647 West Virginia St., archt.

Ont., Toronto—See "Contracts Awarded."

CONTRACTS AWARDED

Conn., Hartford—Industrial Constr. Co., general contractors, 721 Main St., limestone for 2 story, 65x155 ft. and 40x45 ft. insurance building, for Caledonian Insurance Co. of Scotland, 555 Asylum St., to Heltonville Limestone Co., Heltonville, Ind. Noted Mar. 19, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded."

Minn., Minneapolis—Donaldson Realty Co., C. V. Smith, secy., 538 Northwestern Bank Bldg.

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†*Federal Government*

Commercial Buildings (Continued)

general contract 2 story (ultimately 6 story), basement, 164x165 ft. store and office, 2nd Ave., South and 8th Sts., to Johnson, Drake & Piper, 1138 Baker Bldg. Total est. $200,000. Noted Apr. 10, C. D.—Apr. 16, E. N.-R., under "Contracts Awarded."

N. J., Bloomfield — Brookdale Homes, Inc., constructing group 25 brick dwellings, day labor and separate contracts Est. about $140,000. Private plans.

★ **N. J., Teaneck** – Teaneck Builders, Inc., River Road, constructing 140 houses and possibly an apartment, Cedar Lane, own forces. Est. $1,000,000 plus.

N. Y., Bayside—Jamaica Bay Land Co., Brookville Blvd. and Hook Creek, constructing group brick dwellings on 400 lots, Brookville Blvd. and Hook Creek, day labor, $140,000 or more. Owner will purchase material.

N. Y., Brooklyn—Artcraft Properties, Inc., 1053 Nostrand Ave., constructing 6 story apartment, 1048 East 13th St., separate contracts now being awarded, $150,000. Levy & Berger, 375 Fulton St., archts. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

N. Y., Brooklyn — Greenspan Homes, 6324 24th Ave., constructing group brick dwellings, 780 East 17th St. and vicinity, day labor and separate contracts, $140,000. J. Millman, 184 Joralemon St., archt. Owner is purchasing materials. Noted Mar. 11, C. D.—Mar. 19, E. N.R.

N. Y., Brooklyn—Corporation, c/o J. Zager, 1470 Troy Ave. (1st unit), group 1 story, brick dwellings, Glenwood Rd. and East 54th St., to John Contr. Co., 1470 Troy Ave. Est. $140,000. S. Custerson, c/o owner, archt. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

N. Y., Brooklyn—A. Ferranti, 831 Albany Ave., constructing group 1 story, brick dwellings, 1200 East 49th St., separate contracts now being awarded, $140,000. H. A. Weinstein, c/o owner, archt. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

N. Y., Elmhurst—Prosperity Homes Development Corp., 829 Astoria Blvd., Long Island City, group 2 story frame dwellings, 24th Ave. near 90th St. separate contracts now being awarded, $140,000. Wuest & Bailey, Bridge Plaza, Long Island City, archts. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., Flushing—Jaxland Realty Corp., 146th St. and North Hempstead Turnpike, constructing group 2 story, frame dwellings, 156th Rd. and 146th St., separate contracts and day labor, $140,000. J. Unger, 39-01 Main St., archt. Noted Mar. 19 C. D.—Mar. 19, E. N.-R.

N. Y., Flushing—Manor Homes, Inc., 369 Lexington Ave., New York, group 2 story, frame dwellings, 25th Dr. and 166th St., day labor, $140,000. Owner will purchase materials. J. Unger, 39-01 Main St., archt. Noted Mar. 19, C. D.—Mar. 26, E. N.-R.

N. Y., Flushing — Prosperity Homes, 40-09 82nd St., Jackson Heights, constructing group 2 story, frame dwellings, 45th Rd. and 192nd St., separate contracts now being awarded, $140,000. A. E. Allen, Garden City, archt. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

N. Y., Hartsdale—Dorolyn Corp., c/o G. T. Hirsch, archt., 127 Soundview Ave., White Plains, constructing group 30 dwellings, Manor Woods, day labor and separate contracts. To exceed $150,000.

N. Y., Hollis—Goldmack Realty Corp., 104-22 46th St., Richmond Hill, group 1 story, frame dwellings, Wood St. and Illion Ave., day labor and separate contracts, $140,000. J. E. Cahill, 80-64 163rd St., Jamaica, archt. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

N. Y., Ithaca—Lion Realty Exchange, F. L. Tyler, mgr., constructing 10 or more residences in Eastwood Development near Upper East State and Cornell Sts., own forces. To exceed $140,000. Owner purchases materials.

N. Y., Jackson Heights—S. Atlas, 413 Avenue N, Brooklyn, group 2 story, brick dwellings, 34th Ave. and 71st St., separate contracts and day labor. $140,000. Owner will purchase materials. S. M. Palm, 159-15 Northern Blvd., Flushing, archt. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., Jackson Heights—Garland Realty Co., c/o Queensboro Corp., 81-20 37th Ave., constructing 6 story apartment, 34th Ave. and 85th St., separate contracts now being awarded, $140,000. Private plans. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., Kew Gardens—Briarwood Estates, Grand Central Parkway, constructing group 50 dwellings, Grand Central Parkway, day labor and separate contracts. $400,000. Owner is purchasing material. Private plans. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

N. Y., Laurelton—J. and M. Spevack, Cross Island Blvd. and 131st Ave., group brick dwellings, Cross Island Blvd. and 131st Ave., separate contracts now being awarded. $150,000 or more. A. E. Fahr, c/o owner, archt. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., Long Island City — Baldwin Realty Corp., 31-16 30th Ave. (1st unit), 4 story apartment, 48th St. and 31st Ave., separate contracts now being awarded. $140,000. C. W. Marsac, 31-16 30th Ave., archt.

N. Y., Long Island City — Bravdey Realty Corp., 943 50th St., Brooklyn, 4 story, brick apartment, 28th Ave. and 33rd St., separate contracts. $140,000. Wuest & Bailey, Bridge Plaza, archts. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., Long Island City—Skillman Avenue Realty Corp., 535 5th Ave., New York, 6 story apartment, 42nd St. near Skillman Ave., separate contracts now being awarded, $200,000. H. I. Feldman, 15 West 44th St., New York, archt. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

N. Y., New Rochelle—Haring & Blumenthal Realty Corp., Wilmot Rd. opposite Scarsdale Downs, tract development and constructing group brick dwellings, Wilmot Rd. opposite Scarsdale Downs, day labor and separate contracts. $150,000 or more. Noted Mar. 4, C. D.—Mar. 12, E. N.-R.

N. Y., New York—Essen Holding Corp., 420 Lexington Ave., constructing, altering heating, plumbing in store and apartment, 1 West 117th St., separate contracts awarded. $38,000 with fixtures. D. S. Lang, 206 Bway., archt. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., New York—Hotel Astor, Bway. and 44th St., air conditioning Hotel Astor, to W. M. Ballard Co., 347 Madison Ave. Est. exceeds $100,000. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., New York—Mutual Life Insurance Co., 32 Nassau St., altering heating, plumbing in 5 story store and apartment, 198 8th Ave., separate contracts awarded. $38,000 with fixtures. D. E. McElroy, c/o owner, archt. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., New York—New York Savings Bank, 81 8th Ave., altering heating, plumbing in 6 story apartment, 540 West 165th St., separate contracts awarded. $55,000. T. O'Read, c/o owner, archt. Noted Mar. 4, C. D.—Mar. 12, E. N.-R.

N. Y., New York—One Park Avenue, Inc., 1 Park Ave., altering heating, plumbing in office and store, 1 Park Ave., to Rheinstein Constr. Co., 21 East 40th St. Est. $65,000. Contractor awarded separate contracts. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

N. Y., New York—Parkteen Realty Corp., 349 East 149th St., 6 story apartment, 97 East 116th St., separate contracts now being awarded. $140,000. C. Kreymborg, 349 East 149th St., archt. Noted Mar. 5, C. D.—Mar. 12, E. N.-R.

N. Y., New York—Rampo Estates, 182 West Fordham Rd., constructing group 2 story, brick dwellings, Tibbett Ave. and 232nd St., separate contracts now being awarded. $140,000. G. G. Foster, 501 5th Ave., archt. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

N. Y., Ozone Park—Truce Homes, Inc., 163-18 Jamaica Ave., constructing group 1 story, 21x42 ft., brick dwellings, 86th St. and 133rd Ave., separate contracts and day labor. $140,000. D. J. Levinson, 161-02 84th Dr., Jamaica, archt.

N. Y., New York—Two Park Avenue Building, Inc., 2 Park Ave., altering heating, plumbing in 25 story office and school building, 2 Park Ave., to Marshall Constr. Co., 250 West 57th St. Est. $75,000. Contractor awarded separate contracts. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

N. Y., New York—Wagner Building Corp., c/o Halsey McCormack & Helmer, 286 5th Ave., constructing store and office, Grand Concourse and East Fordham Rd., to C. T. Wills, 286 5th Ave. Est. $150,000 or more.

N, Y., New York—Yatespark Realty Corp., M. Warenhaupt, pres., 840 Bway., group 2 story, brick dwellings, Yates Ave. and Morris Park Ave., day labor and separate contracts, $140,000. J. J. Berger, c/o owner, archt. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., New York—Zehnagebot Bros. Realty Corp., c/o Miller & Goldhammer, archts., 40 East 49th St., constructing apartment, Shakespeare Ave. and 170th St., separate contracts now being awarded. $200,000. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., New York—S. K. Zinman, 258 Bway., altering heating, plumbing in apartment, 118 East 91st St., separate contracts awarded. $40,000. A. J. Simberg, 31 Union Sq., archt.

N. Y., Poughkeepsie—Vassar College, general contract library, on campus, to E. V. Anderson, 25 Market St., Poughkeepsie. General contractor awarded excavation for same, to W. A. Shafer Constr. Corp., 3 Cannon St.; structural steel, to Belmont Iron Wks., 44 Whitehall St., New York. Bids Mar. 23. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

N. Y., Rye—H. A. Lockwood & Co., Rye., constructing 30 residences with attached garages, Post Rd. and Park Ave., own forces. To exceed $140,000. Private plans.

N. Y., Springfield—Economy Housing & Development Corp., 173rd St. and 140th Ave., group 30 brick dwellings, incl. air conditioning, separate contracts and day labor. To exceed $150,000. Private plans.

N. Y., Springfield — Franksons Realty Co., 140-08 171st St., group 2 story, frame dwellings, 140th Ave. near 173rd St., day labor and separate contracts. $140,000. L. Danacher, 147-25 Jamaica Ave., archt. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., White Plains—Avondale Builders, Inc., or c/o O. I. Silverstone, archt., 153 Pierrepont St., Brooklyn, apartment, Broad Parkway and Main St., separate contracts. $300,000.

N. Y., Woodside—Hub Homes, Inc., 63rd St. and Queens Blvd., constructing group brick dwellings, 63rd St. and Queens Blvd., separate contracts and day labor. $140,000. Private plans. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

R. I., Providence—J. Lisker, c/o D. Shapiro, archt., 58 Weybosset St., plumbing for 3 story, basement, 84x196 ft. apartment, to J. P. Cuddigan, 938 Broadway, East Providence, for Two Hundred Eighteen Waterman St. Co., J. Lisker. Noted Apr. 7, C. D.—Apr. 9, E. N.-R., under "Contracts Awarded."

Tex., Dallas — Ford Motor Co., Dearborn, Mich., 1 and 2 story, brick, frame exhibition building, plain found., to Central Contg. Co., Construction Bldg. Est. about $300,000. Noted Mar. 19, C. D.—Mar. 26, E. N.-R.

Ont., Toronto—L. L. E. Farrow, 169 Dunnegan Rd., constructing 70 suite, 5 story, brick, rein.-con. apartment house, plain found., Oriole Parkway, separate contracts. Est. $140,000. Noted Mar. 7, C. D.—Mar. 14, E. N.-R.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., Burbank — DISTILLERY — Three G Distillery, 3112 West San Fernando Rd., Burbank, D. Greenberg, pres., 5335 Malrose Ave., Los Angeles, plans by A. R. Sedgley, 910 North Serrano Ave., Los Angeles, distillery addition, 3112 West San Fernando Rd., $250,000.

Conn., Danbury—PLANT—Yameen Fur Co., A. Yameen, 42 River St., plans rebuilding 2 story, 75x142 ft., steel, concrete plant, River St., recently destroyed by fire. $40,000. Private plans.

Conn., Waterbury — FACTORY — Waterbury Buckle Co., J. La Vigne, genl. mgr., sketches brick plant addition, South Main St. $40,000. Private plans.

Conn., Waterbury—PLANT—Lux Clock Mfg. Co., Johnson St., plans by H. T. Moeckel, 33 Hill St., Naugatuck, 1 story, basement, 3 story, basement, 40x170 ft. and 44x143 ft. brick factory additions, Johnson St. $65,000.

Ill., Abingdon — FACTORY — Globe-Superior Corp., Abingdon, soon takes bids (3rd unit) 2 story, basement, 95 x 130 ft. factory and office building, North Main St. $50,000. Aldrich & Aldrich, Bondi Bldg., Galesburg, archts. Noted Jan. 7, C. D.

Ind., Edwardsport — SWITCHBOARD CONTROL ROOM—Public Service Co. of Indiana, plans repairs and equipment to switchboard control room. $50,000.

Md., Baltimore — DISTILLERY — National Wholesale Liquor Co., 410 East Pratt St., has taken option on 16 acre tract, Philadelphia Rd., for distillery. To exceed $50,000.

Md., Baltimore—FOUNDRY—Flynn & Emrich Co., Grantley Rd. and W. M. R.R., plans by W. S. Austin, Maryland Trust Bldg., 1 story, 80x200 ft., steel frame, brick foundry, Grantley Rd. and W. M. R.R. $50,000.

Mass., Boston — BUS TERMINAL — Eastern Massachusetts Street Railway, 38 Chauncy St., Boston, plans by Geo. A. Cornet, 14 Central Ave., Lynn, 3 story, basement, 60x110 ft., brick, stone, steel bus terminal, concrete found., Blackstone and Endicott Sts. $150,000.

Mass., Erving — POWER PLANT — Erving Paper Mill, M. Hassen, agt., plans repairing 1 story, power plant, damaged by flood. $60,000. Private plans.

Mass., Leicester — FACTORY, etc. — River Woolens, Inc., J. White, pres. Zelkind Waste Co., 9 Winter St., Worcester, plans rebuilding concrete, brick, steel dye house and dam destroyed by flood, Cherry Valley. To exceed $40,000. Private plans.

Mo., Jennings—PLANT—Buck X-Ograph Co., 8709 X-Ograph Ave., soon lets contract 2 story, 32x96 ft., rein.-con., brick, steel X-Ograph plant addition, 8709 X-Ograph Ave. Private plans.

Mont., Missoula — ROUNDHOUSE—Northern Pacific Ry. Co., B. Blum, ch. engr., 176 East 5th St., St. Paul, Minn., plans constructing 7 stall section for round house, extending turntable, raising coal docks, relaying 25 mi. steel rails, etc.

Neb., Omaha—SHOPS—Gate City Iron Wks., 11th and Seward Sts., plans constructing sheet iron buildings for additional shops, on ground adjoining their plant, recently purchased. $40,000.

N. Y., Albany—FERTILIZER PLANT—G. L. F. Mills, Inc., L. V. Rowley, mgr., Albany, plans constructing fertilizer plant, Port of Albany. To exceed $40,000. Engineer and architect not appointed.

N. Y., Brooklyn — FACTORY — Thirty-Five Steuben Street Corp., 351 Park Ave., plans by M. Klein, 65 Court St., constructing 2 story, 100x110 ft., brick light manufacturing and storage building, 351 Park Ave. $110,000.

N. Y., Brooklyn—STORAGE, etc.—Allied Industrial Alcohol Corp., 7 Van Brunt St., plans constructing storage tank, Kane and Van Brunt Sts. Est. about $25,000. E. M. Wharff, c/o owner, engr.

N. Y., Jeffersonville—GARAGE, etc.—Markson Dairy Co., plans constructing garage and warehouse. Est. about $37,000. Architect and engineer not appointed.

N. Y., New York—BUS TERMINAL—Cinema Realty & Leasing Corp., 551 5th Ave., bids in July or later, general and separate contracts bus terminal and service building, Inwood Ave.

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†*Federal Government*

Industrial Buildings (Continued)

and 170th St. $45,000. E. DeRosa, 105 West 40th St., archt. Noted Mar. 11, C. D.—Mar. 19. E. N.-R.

N. Y., New York—FACTORY—R. E. Dietz Co., 60 Laight St., will award contract May 15, from bids already submitted for altering 9 story factory, 60 Laight St. $130,000. W. Higginson, 101 Park Ave., archt. Noted Mar. 13, C. D.—Mar. 1, E. N.-R.

N. Y., New York—FACTORY—First and 40th Street Corp., 344 East 40th St., bids after June 1, separate contracts three 5 story factory buildings, 695 1st Ave. $45,000. J. Lubroth, 26 Court St., Brooklyn, archt. Noted Feb. 7, C. D.—Feb. 13, E. N.-R.

N. Y., New York—STORAGE, etc.—Franklin Textile Corp., 357 Bway., plans constructing 2 story storage and showrooms, 84 Leonard St. $40,000. Site acquired.

N. Y., Palmyra—FACTORY—Garlock Packing Co., plans constructing factory addition, incl. sprinkler system which is to be purchased. To exceed $40,000. Private plans.

N. C., Goodsonville (R. Sta. Lincolnton)—MILL—Boger & Crawford Spinning Mills, J and Venango Sts., Phila., Pa., plans 2 story, 400 ft. mill, on Charlotte Hy., at Goodsonville. To exceed $37,000.

O., Cleveland — FACTORY — Thornton Co. (sheet metal), F. A. McCloud, pres., 3441 East 76th St., plans completed 1 story, 60x182 ft., brick, steel factory addition. Private plans.

O., Dayton — FACTORY — Hewitt Soap Co., Linden Ave., plans 2 story, basement, rein.-con. addition to soap making plant, plain found., Linden Ave. $50,000. Private plans.

O., Springfield—SERVICE—Ohio Edison Co., 47 North Main St., Akron, plans new service building. $100,000. H. E. Miller, div. mgr.

O., Toledo — PLANT — City Auto Stamping Co., A. Lint, pres., Lint Ave., soon takes bids for 50,000 sq.ft. addition to present structure.

Okla., Oklahoma City—COMPRESSOR STATIONS—Anderson-Pritchard Co., Ramsey Tower, made preliminary plans 300 hp. natural gas compressor stations at Northeast 38th St. and Phillips. $130,000. E. H. Wahl, Oklahoma City, engr.

S. C., Mullins—WAREHOUSE—C. O. Dixon & Son, Mullins, plans large tobacco warehouse. Est. $50,000.

Tex., San Antonio — PACKING PLANT — Roegelein Provision Co., Saltillo and Brazos Sts., revised plans by M. Eickenroht, Maverick Bldg., general contract 1 story, 32x112 ft. fresh meat packing plant, also includes curing of meats. Most mechanical contracts let. Total est. $80,000. W. E. Simpson Co., Milam Bldg., and L. D. Royer, Smith-Young Tower, engrs. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

Wis., Waukesha—PLANT—J. P. Bruecker, archt., 1581 West Prospect Ave., Milwaukee, soon lets contract 2 story, basement, 41x114 ft. printing plant, South St., for Freeman News, 259 South St. Noted Mar. 2, C. D.—Mar. 5, E. N.-R.

Wis., West Milwaukee — FACTORY — Chain Belt Co., 1600 West Bruce St., C. R. Messinger, pres., plans addition to manufacturing building. $50,000.

Canada — CANNERIES — See "Contracts Awarded."

Man., Winnipeg—DAIRY—City Dairy Ltd., 329 Notre Dame Ave., R. J. Ball, mgr., plan constructing addition to plant, $200,000, and installing additional equipment.

Ont., Mount Denis—PLANT—Canada Brick & Tile Co. Ltd., 70 Verona Ave., making plans plant for manufacturing cement blocks, tile products, etc. $40,000.

BIDS ASKED

Conn., Waterbury—WAREHOUSE—F. Fepe, 42 Canal St., taking bids 4 story, 75x80 ft., brick warehouse addition, Canal St. Est. $40,000. H. T. Moeckel, 33 Hill St., Naugatuck, archt.

Mont., Shelby—POWER PLANT—See "Contracts Awarded."

N. Y., Binghamton—PLANT—See "Contracts Awarded."

N. Y., Dunkirk — WIRE PLANT — Ludlum Steel Co., 66 Howard Ave., taking bids plant addition, 66 Howard Ave., $55,000; also taking bids 15 ton crane for 65 ft. span for new wire plant. To exceed $1,000.

N. Y., Naples—WAREHOUSE—See "Contracts Awarded."

N. Y., New York—GARAGE—See "Contracts Awarded."

N. Y., New York — FACTORY, etc. — See "Contracts Awarded."

N. Y., Ozone Park — WAREHOUSE — M. Kampe, archt., 411 Union Sq. W., New York, taking bids general and separate contracts brick warehouse with equipment, Dumont Ave. and 84th St., for Adelphi Paint & Color Wks., 86th St. and Old Smith Rd., $37,000 with equipment. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

R. I., Bristol—STORAGE—Apr. 30 by Herreshoff Mfg. Co., 20 Burnside St., 1 story, 105x265 ft., brick, steel storage unit for boat manufacturer. To exceed $37,000. Private plans. Noted Feb. 21, C. D.—Feb. 28, E. N.-R.

CONTRACTS AWARDED

Calif., Beverly Hills—FACTORY—Payne Furnace & Supply Co., 338 North Foothill Rd., 78x150 ft. and 42x72 ft. factory addition and new administration building (not incl. plumbing, electric wiring, painting and elevator), 338 North Foothill Rd., to L. D. Richardson & Co., 9437 Santa Monica Blvd. Est. exceeds $37,500. Noted Mar. 6, C. D.—Mar. 12, E. N.-R.

Colo., Denver—GRAIN ELEVATOR—Nebraska Consolidated Mills, 1521 North 6th St., Omaha, Neb., constructing new rein.-con. grain elevator, 6 stories high, to J. T. McDowell, U. S. National Bank Bldg. Est. $350,000. Awarded Apr. 7. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

Ga., Atlanta—PLANT—Southern Waxed Paper Co., 840 Woodrow Ave. S.W., 1 story, basement, 100x200 ft., brick, concrete, steel plant addition, to S. M. Hodges, Atlanta. Private plans. Awarded Apr. 8.

Idaho, Idaho Falls—FACTORY—Roy Farr, Idaho Falls, constructing 40 x 140 ft. ice cream and candy factory, to D. J. Sweeney, Idaho Falls. Est. $30,000.

Ill., Chester — GRAIN ELEVATOR — H. C. Cole Milling Co., Chester, constructing 4 large and 10 small rein.-con. bins for grain elevator, to Ryan Constr. Co., 503 Kneeline Bldg., Omaha, Neb. Horner & Wyatt, 470 Bd. Trade Bldg., Kansas City, Mo., engrs.

Md., Relay — WAREHOUSE — Maryland Distilling Co., constructing 6 story, 131 x 134 ft., rein.-con. frame warehouse, to Consolidated Eng. Co., 20 East Franklin St., Baltimore. Est. $100,000. Noted Feb. 26, C. D.—Mar. 5, E. N.-R.

Mich., Grand Rapids — FACTORY — Kindel Furniture Co., 2 story, 43x100 ft., brick, steel, rein.-con. furniture factory addition, plain found., to Owen-Ames-Kimball Co., Grand Rapids. Est. $40,000.

Mo., St. Louis—PUBLISHING BUILDING—Dickie Constr. Co., general contractors, 517 Louderman Bldg., brick work for 3 story, 59 x 94 ft. publishing building for Daily Record Co., H. N. Moore, pres., 1010 Fullerton bldg., to F. Daues & Son, 3453 Gasconade Ave.•••structural and sundry iron and fire escapes, to Spuck Iron & Fdry. Co., 14th and Branch Sts.•••excavating, to J. Schaefer Co., 7340 Northmoor St.•••electrical work, to Dennison-Loepker Electric Co., 15 South 10th St.•••elevator, to Otis Elevator Co., 2301 Locust St.•••granitoid and cement work, to H. A. Dailey, Inc., 4108 Clayton St. •••plumbing, to W. L. Clucas & Co., 11 North Grand St.•••office partitions, to E. F. Hauserman Co., 3964 Washington St.•••cabinet work, to H. Pauk & Sons Mfg. Co., 1321 North 15th St.•••heating, and air conditioning, to Bradley Heating Co., 3834 Olive St. and Natkin & Co., 3624 Washington St.•••damproofing, to Par Lock Appliers of St. Louis, Chemical Bldg.•••directory, to Tablet & Ticket Co., 411 North 10th St.•••wood block floors, to Midland Creosoting Co., Granite City, Ill.•••floor treatment, to Vestal Chemical Laboratories, Inc., 4963 Manchester St.•••glass and glazing, to Pittsburgh Plate Glass Co., 3900 Chouteau St.••• ornamental iron, to Ushona Mfg. Co., 3510 Chouteau St.•••metal doors, to F. A. Cammann Builders Service Co., Century Bldg.•••mail chute, to Cutlet Mail Chute Co., c/o H. C. Morrison, Railway Exch. Bldg.•••marble, to Bradbury Marble Co., 3401 Morganford St.•••metal lathing, furring and plastering, to H. Niehaus Plastering Co., Louderman Bldg.•••plastic caulking, to Zumwalt Co., 1617 Lafayette St.•••rubber covered surfaces, to Thomas Moulding Floor Co., c/o G. Caine, Chemical Bldg.•••sheet metal work, to Mound Rose Cornice & Sheet Metal Wks., 1726 North Euclid St.•••hollow metal windows and casements, to Hope's Window, Inc., Chemical Bldg.•••wood floors, to Missouri Floor Co., 4360 Duncan Ave.•••granite and limestone, incl. setting, to Stevens & Son, 119 Miller St. •••tram rail, to Cleveland Tramrail Co., Wickliffe. Noted Mar. 19, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded."

Mo., St. Louis—ELECTRICAL APPLIANCE PLANT—J. R. Kearney Corp., 4236 Clayton Ave., general contract 2 story, basement, 65x125 ft. electrical appliance plant addition, to H. B. Deal & Co., Inc., 2118 Olive St. Contractor taking bids on sub-contracts.

Mont., Shelby — POWER PLANT — Great Northern Utilities Co., Shelby, installing 1,000 kw. turbo-generator and miscellaneous equipment in plant, force account. Est. $10,000 for equipment.

N. Y., Binghamton — PLANT — Binghamton Foundry & Machine Co., Floral Ave., constructing 75 x 200 ft. plant addition, Floral Ave., own forces. Est. about $37,000 incl. equipment. Owner interested in purchase beam punch for new structural steel fabrication division. Private plans. A. Holford in charge.

N. Y., Buffalo—BOILER HOUSE, etc.—Air Reduction Sales Co., 730 Grant St., steel sash for boiler house and garage, to Campbell Metal Window Corp., 30 Rockefeller Plaza, New York •••glass and glazing, to Pittsburgh Plate Glass Co., 101 Seneca St.•••ornamental iron, to August Feine & Sons Co., 140 Terrace. Noted Mar. 30, C. D.—Apr. 2, E. N.-R., under "Contracts Awarded."

N. Y., Hempstead—DISTRIBUTION, etc.—Jacob Ruppert Brewing Co., 1639 3rd Ave., New York, distribution and storage addition, to Esterbrook Contg. Co., Hempstead. Est. $37,000 or more. General contractor awarded 275 tons structural steel, to J. T. Ryerson & Son, 203 Woodside Ave., Jersey City, N. J.

N. Y., New York — GARAGE, etc. — Blyte Super-Service Auto Corp., 51 Madison Ave., altering 3 story garage and service building, 143 East 24th St., separate contracts, $37,000. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

N. Y., New York — FACTORY, etc. — Five Hundred Fifty-Four Madison Ave., 70 Bway., constructing 2 story, light manufacturing and storage building, 554 Madison Ave., separate contracts. $75,000. Gross & Gross, c/o owner, archt. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., Buffalo—PLANT—Trico Products Co., 817 Washington St., structural steel for shed to store scrap metal, to Buffalo Structural Steel Corp., 166 Dart St. Est. exceeds $1,000. Noted Feb. 19, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

N. Y., Highland—MILL—L. T. Schoonmaker Constr. Co., general contractors, 307 Lucas Ave., Kingston, structural steel for mill, for Rathgeb Knitting Mills, Inc., Milton Ave., to Hudson Valley Builders Steel Co., 178 Cottage St., Poughkeepsie. Noted Mar. 30, C. D.—Apr. 2, E. N.-R.

N. Y., Naples — WAREHOUSE — Widmer's Wine Cellars, West Ave., constructing 85 x 135 ft. warehouse, West Ave., own forces. To exceed $40,000. F. H. Day, 119 East Main St., Rochester, archt.

N. Y., Woodhaven—GARAGE, etc.—D. Brown Co., 5312 New Utrecht Ave., Brooklyn, 2 story garage and storage, 101st Ave. and 105th St., separate contracts awarded. $37,000 with equipment. A. Farber, 105 Court St., Brooklyn, archt. Noted Mar. 19, C. D.—Mar. 26, E. N.-R.

North Carolina — MILL — Burlington Mills, Burlington, constructing new Mill 3 and altering Mill 1 at Burlington, also addition to mill at Statesville, to C. W. Angle, Inc., Greensboro. Est. exceeds $37,000.

N. C., Greensboro—PLANT—Blue Bell Overall Co., C. C. Hudson (owner of building), rebuilding plant, South Elm and West Lee Sts., destroyed by tornado, to G. W. Kane, Greensboro, approximately $50,000.

O., Cleveland—FACTORY—Willard Storage Battery Co., P. H. Voth, engr., East 131st St. and St. Clair Ave., constructing 80x96 ft., brick, steel factory addition, to A. M. Higley Co., 2036 East 22nd St. Bids Apr. 3, awarded Apr. 13. Noted Mar. 31, C. D.—Apr. 2, E. N.-R.

★ **Pa., Pittsburgh**—STEEL SHEET MILL—Jones & Laughlin Steel Corp., 3rd and Ross Sts., construction of new continuous steel sheet and strip mill, to Merritt-Chapman & Scott Corp., 17 Battery Pl., New York, and Jerome A. Utley, 6031 Mansur St., Detroit, Mich., $1,500,000. Owner furnishing all steel required, incl. steel piles, structural steel, reinforcing steel. Noted Apr. 15, C. D.—Apr. 16, E. N.-R., under "Contracts Awarded."

South Carolina—SERVICE STATIONS—Sinclair Refining Co., 573 West Peachtree St. N.E., Atlanta, Ga., 8 filling stations at following locations, new and trade structures, Meeting and Market Sts., Coming and Calhoun streets, Spring and Ashley Streets, to Dawson Eng. Co., 10 Gillon St., Charleston, $6,000 each•••1 station at Mount Pleasant, 2 at Summerville, and 1 at Charleston Airport, to E. H. Livingston, Newberry, est. $6,000 and $7,000. Total est. exceeds $40,000.

★ **Utah, Provo** — ELECTRIC PLANT — Utah Power & Light Co., Kearns Bldg., Salt Lake City, constructing foundations for steam electric plant, at mouth of Provo Canyon, to Ryberg Bros., Interurban Bldg., Salt Lake City, $20,000. Total est. $1,600,000. J. A. Hale, Kearns Bldg., ch. engr. Noted Feb. 18, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

Wash., Seattle—AIRPLANE PLANT—Boeing Aircraft Co., 200 West Michigan Ave., 204x304 ft., assembly structure, 53 ft. high, also 1 story, 35x50 ft. power house, etc., 14th St., to Austin Co., Dexter Horton Bldg., $250,000. The contractor is also architect for project. Awarded Apr. 9.

Wis., Superior — FACTORY — Union Sash & Door Co., C. Ahlborg, pres., 2 story, 45 x 105 ft., steel factory, plain found., day labor, J. O. Bach, Superior, archt.

Canada — CANNERIES — Empire Food Products Corp. Ltd., head office 159 Bay St., Toronto, Ont., 2 boilers at Essex and Trenton plants, to Leonard Boiler Co., 159 Bay St., Toronto, Ont. Owners are interested in receiving prices on new canning machinery, plumbing, piping, valves, motors and transformers, roofing, steel sash, belt and slat chain conveyors are to be installed at all plants in Essex, Ont., Trenton, Ont., St. Martin, Que. Materials for building will be purchased and structural work will mostly be done by own forces. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

Ont., Leamington—FOOD FACTORY—H. J. Heinz Co., Erie St. S., constructing (1st unit) 4 story, basement, 91 x 178 ft., brick, steel extension, Erie St. S., to Pigott Constr. Co. Ltd., Pigott Bldg., Hamilton; supplying, installing 2 integral furnace boilers, pulverized coal fired, complete with pulverizers, air heaters, fans, boiler settings, etc., to Babcock-Wilcox & Goldie-McCulloch Ltd., Bank of Hamilton Bldg., Toronto. Est. $200,000.

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†*Federal Government*